FOOD INDUSTRIES

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MAY, 1937

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VOLUME 9, NUMBER 5 PUBLISHED MONTHLY

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McGRAW-HILL PUBLISHING COMPANY, INC.

Publication Office: 99-129 North Broadway, Albany, N. Y. *Editorial and Executive Offices:* 330 West 42d Street, New York, N. Y.

Branch Offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

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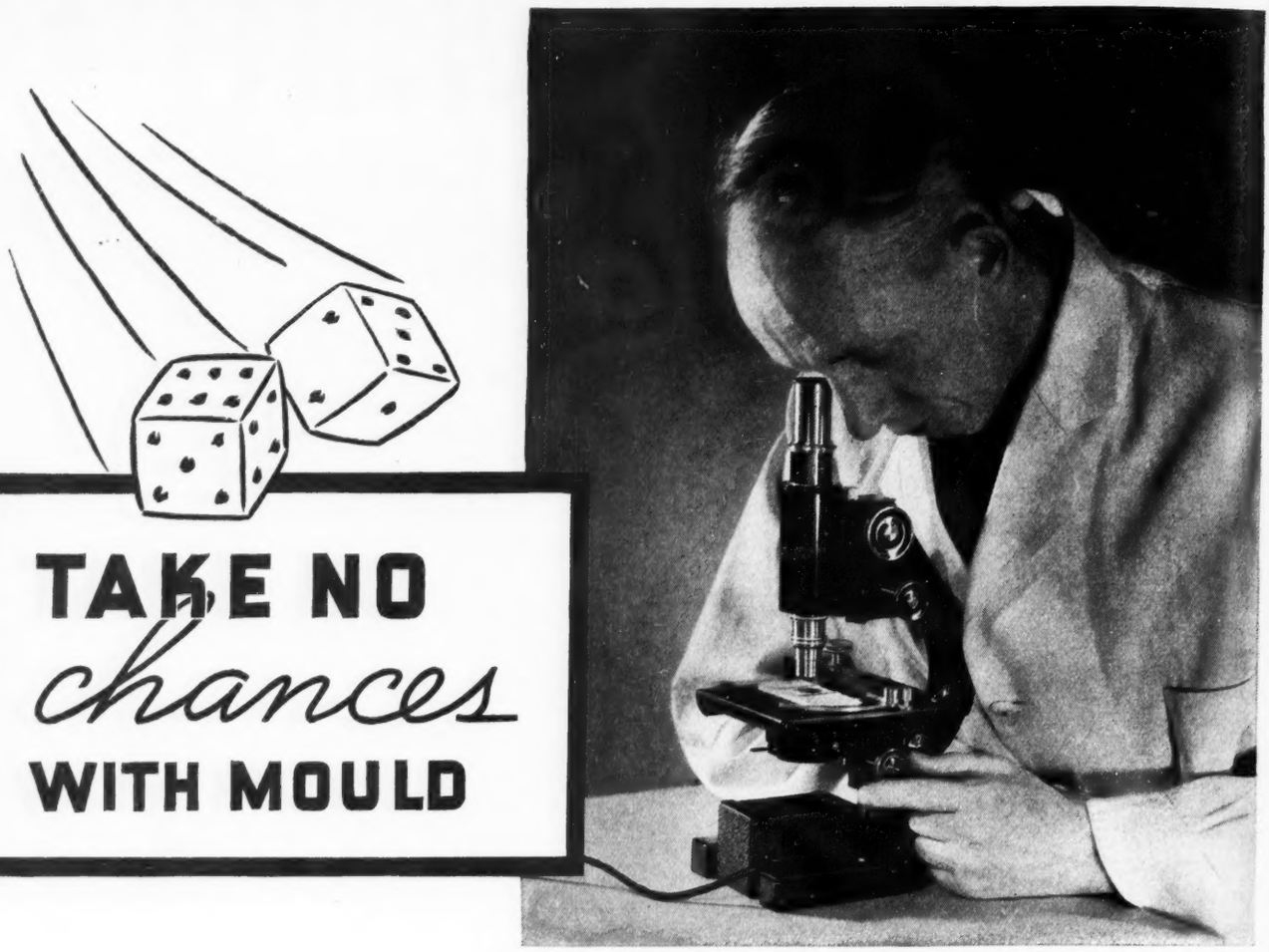
Published monthly; price 35c a copy. Subscription rates: United States, Canada, Mexico, and Central and South American countries, $3 a year. All other countries, $5 a year or 20 shillings. Entered as second-class matter Aug. 17, 1936, at the Post Office, Albany, N. Y., under the act of March 3, 1879. Cable address: "McGrawhill, New York." Member of A.B.P. Member of A.B.C. Contents indexed monthly in the Industrial Arts Index. Copyright, 1937, by McGraw-Hill Publishing Company, Inc.



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FOOD INDUSTRIES

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Established 1928—McGraw-Hill Publishing Company, Inc.

Vol. 9, No. 5

Laurence V. Burton, Editor

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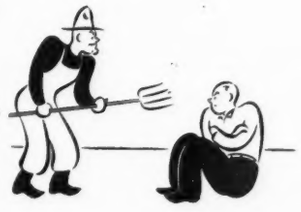
MAY 1937

The Talk of the Industry

» SOMETHING NEW in the gentle art of replevining a plant from sit-downers has been developed at the Hershey Chocolate Co. Ordinarily Hershey buys about 800,000 lb. of milk a day and when the plant closed down by a strike there was no ready market for this amount of milk. Farmers impatiently waited five days for reopening the plant and then acted on their own account.

It did not take them very long to clean out the place. We cautiously suspect that dealing with enraged farmers is something that is quite new to so-called "labor leaders."

» SPEAKING OF SIT DOWNS, the oxy-acetylene welding outfit seems to be the first tool to be used by most strikers, for welding shut the doors and gates of factories.



» THE NEXT GAG is for chemists only. Others may read it at their own peril. What is malted milk—legally speaking?

Not long ago we called on an old friend of AEF days whose job is the enforcement of state food laws. His current problem was to keep peace between his office and a malted milk manufacturer who claimed that a competitor was breaking the law. The price cutter was accused of mixing powdered malt and powdered milk and selling it for "malted milk." On the other hand the law of the Sovereign State said something to the effect that the milk should first be subjected to the full diastatic power of the malt before it could be called malted milk.

Since diastase acts only on starch and since there is no starch in milk on which it can exert its diastatic powers—full or otherwise—the enforcement officer was unable to find grounds for action. Yet the complaining company insisted that he do something, on pain of charges to be preferred against him.

Well, maybe our own job isn't so tough, after all.

» BY A STRANGE TURN of fate we landed in an important embassy in Washington last month in time to hear the ambassador say:

"No, I cannot compare conditions of employment in my country with yours. Why? Because of the great difference in the meanings of the term. In my country, any one who does not work is unemployed; whereas, in your country any one who works for the government is unemployed."

» WHEN THE ENRAPTURED advertising copy writer produces a toothsome phrase for promoting the sale of a food, he had better be sure that the words he uses for his labels are in the dictionary for otherwise the goods may be declared misbranded. And in such a case the Food and Drug Administration has been known to be right mean about it. A part of a nice, juicy $100-and-costs was the price one biscuit company had to pay for toying with the words "Sunalized" and "Ultrasunalized."

Notice of Judgment, Foods & Drugs, 25,301, states very bluntly that the Graham crackers in question were "not sunalized and ultrasunalized." Confidentially speaking, we'd like to know how to tell when graham crackers are not sunalized. It might come in handy some day.

»WITH BREATHLESS INTEREST the country has long awaited the report of the President's commission to study European consumer cooperative enterprises last summer. Their foreign junket included Britain, Sweden, Norway, Denmark, Czechoslovakia, Switzerland, Holland and Belgium. Yet for some unstated reason they scrupulously avoided Germany, Italy and Russia.

All this travel has resulted only in disagreement. Their report is to be merely a study—no recommendations are to be made except that similar

"studies" should be made in the United States. Apparently the boys didn't have such a good time abroad and want to see our own country.

After The Supreme Court—What?

AT LAST the National Labor Relations Act has been adjudicated by the U.S. Supreme Court and is now definitely a law. No longer can it be regarded as something to be stalled off on the ground that it is due for an early demise.

Though the air is clearer, though statesmen and politicians view with alarm or expand with pride over the progressiveness of the adjudicated law, there are many serious implications for industry. The real problem of compliance begins *now.*

First of all comes one important, though little known, fact. The National Labor Relations Board has had very limited funds with which to carry on its work. In the past, members of Congress have told the Board to carry on the work with a very small appropriation until the Supreme Court decided its constitutionality. They have promised that, after favorable adjudication, a full sized appropriation would be forthcoming. If the promise is kept the next step will be a greatly expanded activity of the Board which up to now has not been noticeably effective.

For industry the future carries many problems, and in most of them the rôle of industry will be comparable to the interest of the owner of an establishment in which a wild party is going on—apprehensive but hopeful. At this early date it is difficult to foresee beyond the period when rival claimants for sole representation of workers will be seeking, importuning, even coercing workers to join the rival organizations. The workers are likely to be greatly confused and worried while opposing claims are being "sold" to them.

Of course, the Supreme Court's decisions will greatly stimulate the various drives for membership, and it requires no profound calculation to realize that dues of a dollar or so per month per worker to go to the Washington headquarters of one group of unions or the other constitutes a prize of huge magnitude. On the assumption that there are potentially about 30,000,000 union members it is apparent that some union, presumably C.I.O., will see in this the possibility of developing into a huge business with a membership as large as the popular vote for President Roosevelt and a political power equally as great.

That time is probably several years away, but its very potentiality is ample basis for the various suggestions made elsewhere in this issue.

Without intentionally becoming sentimental, one is tempted to express a deep sympathy for the worker who will soon be pulled this way and that. As it appears now, the rôle of management will be only to deal with the winner of the exclusive bargaining right and either find the money to pay the bills or educate the bargaining agents on cost accounting, rate setting and the great complexities of business.

Meaning of Collective Bargaining

MANY FAIL TO UNDERSTAND what is meant by "collective bargaining"—especially the word "bargaining." Many an alleged grievance which has not reached the newspaper headlines has been found to rest on the employee's erroneous belief that the verb "bargain" means to give in to every employee demand.

Bargaining means negotiating, haggling, trading, as any good dictionary will show. Under the Wagner law as long as management continues to discuss the problems raised by representatives of its workers it is doing its part in bargaining collectively. The law does not require management to agree to employee demands, but it does require, apparently, negotiations without end or selling counter proposals.

Next Winter's Fuel

A RÉSUMÉ of the past heating season is now in order. An analysis of the figures on fuel consumption should be made. Then forecasts for next Winter should be made. But the forecast should not be based only on last Winter's fuel and equipment. Improved boilers and stokers and dif-

Hors d'Oeuvres

• If you were thinking of installing some air-conditioning equipment, let us give you a tip. There is a dealer in Rochester, N. Y., who employs as a sales engineer a 25-year-old girl who is blond, slim and pretty. But don't blame us if you buy enough equipment to air condition two plants the size of yours.

• *Ice cream was first produced commercially in 1851 in Baltimore, the city which plays such an important part in modern English history. By 1900, annual consumption had reached 25 million gallons, and now it is 200 million. Americans have a warm spot in their stomach as well in their heart.*

• Testifying at the FTC hearings on alleged violation of the Patman Law by Standard Brands, leading bakers revealed that there is no dough in bread. And lest the authors of "100 Million Guinea Pigs" think they really have something here, we hasten to say that the bakers were referring to profits.

• *Paint which changes color at a certain temperature is available. Think of the applications in the food field. All the ovens, cooking kettles and what have you could be painted with it. And if an operator isn't galvanized into action when a black kettle turns pink, then temperature control is hopeless.*

• If you were in the meat business and you received orders for 3,000 selected baby chicks, 2,000 English plovers, 2,000 baby guinea hens or 20,000 squabs weighing ¾ lb., each, what would you do? Personally, we'd turn the order over to Nathan Schweitzer Co., New York, which has received and filled these same orders on previous occasions.

• *The crescent-shaped roll is no mere warped piece of bread. It is a symbol. Its significance dates back to the siege of Vienna by the Turks. During this siege, a baker discovered that the enemy was undermining the town. For thus saving the city, the baker was offered a handsome reward by the emperor, and he asked the privilege of baking rolls in the shape of the Turkish crescent.—We don't believe it, either, but it makes a good story.*

• One of the problems faced by British food manufacturers is how to protect their products and employees in event of a poison gas attack by an enemy country. A feature article on this recently appeared in an English food processing paper. So maybe the Patman Law, the C.I.O. and the corporation surplus tax aren't so bad after all.

• *Is meat nutritious? Well, listen to this strange tale about the Sikhs and the Bengali. These are neighboring peoples in India. The Bengali are reported to be miserable specimens of physical fitness, so miserable in fact that they can't qualify as British cannon fodder. But the Sikhs are tall, dark, handsome and have strona backs.—You're right. The Sikhs eat meat while the Bengali are vegetarians.*

ferent types of fuel, all should be considered.

The low-cost factory is one in which the over-all cost of heat, steam, and power has been studiously considered. In most industries the summer is the time in which both such study and any needed remodeling should take place. During the sweltering days of July and August rebuilding should be going on, which means that May is the proper season for analysis and new plans.

Making Glass Enclosures Effective

A SENSE of security and freedom from air-borne bacterial contamination has often been conferred by surrounding tubular coolers with a beautiful room. It looks very impressive to visitors. But vapors arising from warm liquids being cooled will condense on the glass panes. And that is not so beautiful. So to remedy this fogging it is often the practice to connect a suction fan to the room to exhaust the vapor-laden air. And then the glass walls remain bright and transparent.

But right here the sense of security from air-borne contamination is often false, and conditions as affected by dust may be worse than before if the air admitted to the room to replace the exhausted air has not been filtered.

In one such case it required quite a search on our part to discover where the air was entering the cooler room to replace the moist air that was steadily being drawn out. Obviously there was an entrance somewhere, because the walls of the glass room were not collapsing and yet air was continually being drawn out. Finally down near the floor where the piping entered the room was discovered the opening that admitted all this air. The floor was not enitrely dust-free and employees and push-trucks were continually passing. If that plant ever suffers from bacterial or dust contamination it is likely that the trouble will arise at that point.

Stop This Tax Diversion

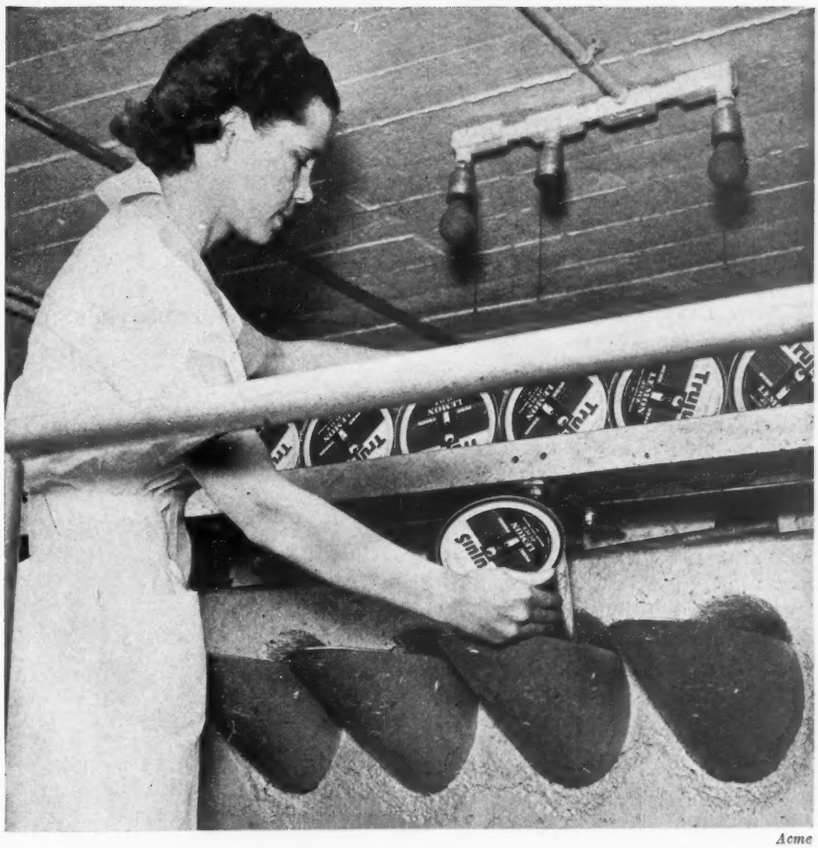
USERS of the nation's highways have a justifiable complaint against the rapidly increasing diversion of motor vehicle tax revenues to purposes other than the construction, maintenance and administration of our highway systems. As early as 1924, ten states were diverting their vehicle tax funds, namely Idaho, Iowa, Kentucky, Maine, Missouri, Nevada, New Hampshire, South Carolina, West Virginia and Wyoming. But by 1936 the number of states diverting these funds had grown from 10 to 35.

From the days of Roman conquest and roadbuilding down through the centuries to the days of the motor vehicle, the user of the highway has uncomplainingly witnessed the rising taxation for the benefit of roads. Even under the very modern device of the duplication of federal and state gasoline taxes, and the increase of license fees especially on motor trucks, the highway user has not been known to become obstreperous as long as the money so raised was spent to build more and better roads.

Under the present conditions of diversion of funds the problem of the private car owner, vexatious though it may be, is a thing quite distinct from that of the owner of a fleet of trucks in the food industries. In the latter case, the cost of motor vehicle taxes goes into the cost of doing business. Many owners feel that it is fundamentally wrong and amounts to double taxation when the state diverts vehicle and gas tax funds to general state funds or for other purposes, such as: enforcement of a state liquor control law or the prevention of soil erosion.

How serious it is becoming is shown by a study of the 1935 figures, the latest yet completely available, which reveal that $147,142,209, or 15.5 per cent, of the total of $950,971,158 of motor vehicle revenues was diverted. The worst offender was the State of New York which in 1935 diverted 58.3 per cent. Massachusetts came next with 43.2 per cent; followed by South Dakota with 39.3 per cent.

It is time for all truck and passenger car owners to take an active stand against this growing evil. Funds collected for public highways should be used for public highways or else such taxes should be abated.



Acme

A GROWING INDUSTRY

Canned and bottled orange juice has become so competitive with the fresh product that California growers are wondering if it is not time to control the supply and price of oranges used for canning. One of the most interesting methods of preserving citrus juices is by quick-freezing. The young lady, whose daytime address is the Pasadena plant of California Consumers Corp., is starting a No. 5 can of juice, freshly packed under vacuum, on its way through a tubular freezer where the temperature is –40 deg. F. Some fifteen minutes later the juice will be frozen solid. The plant froze 6,000 gal. of orange juice daily for six weeks and 3,500 gal. of lemon juice daily for four weeks during 1936.

ISALY SALES PLAN
Hard to Duplicate

Even ex-employees who had learned it thoroughly could not take it with them

By IVAN C. MILLER
Editorial Staff, FOOD INDUSTRIES

FEW ARE THE ORGANIZATIONS that can crash into highly competitive territories, invest heavily in new plants and equipment and in almost miraculously short time develop and hold a profitable market. Nevertheless that is the Isaly Dairy Company's method.

In contrast, the history of American manufacturing recounts many examples of strong competitors absorbing weaker ones, in their advance on new markets. They use the good will and customers of the predecessor companies to form the nucleus on which to start and expand. Such a method is often expensive but is more certain to succeed for most organizations than the Isaly method. Isaly's ability to take root in new soil and thrive is not the result of a startling discovery. Isaly has developed its method through many years of growth and persistent study.

William Isaly, father of the three sons who now own and manage the many Isaly Dairy Company's properties, started a retail milk route in 1899 to get a profitable outlet for the milk from his own dairy herd. Expansion of this route resulted in the formation of the Isaly Dairy Company in 1903, with a dairy plant in Mansfield, Ohio, serving both retail and wholesale accounts. This dairy plant and the one in Marion, Ohio, acquired a few years later, became the testing grounds for the Isaly methods, and the training school for the three brothers, Charles, Sam and Henry, the present owners.

One of the first lessons the Isaly sons learned in their practical training school was the high cost of distribution both in route retailing and wholesaling. Another lesson they learned taught them the unavoidable losses wherever credit transactions were involved. The most important lesson learned in this practical school was to know their customers through personal contact in retail stores. From an early age the boys worked in the dairies, making ice cream and dairy products. They were trained on both the collection and delivery ends of the milk routes. They observed wholesaling, they learned the basic laws of retailing. In their youthful days they watched customers buy ice cream and heard them grumble at the 1½ oz. nickel cone and the 2½ to 3 oz. dime dishes. They knew the ice cream parlor's long mark-up; but they were unable to teach the proprietors the value of narrow margins with greater gross profits through volume sales. They had seen the lack of sanitation, they had revolted at the filth in stores where ice cream was sold, but they had been unable to prevail on retailers to dress up, clean up and otherwise merchandise ice cream and dairy products. The Isaly plan was formulated on these early observations.

Too many retailers in any community are poor business men, and questionable credit risks. Manufacturers must have sales, however, and risks will be taken by one manufacturer or another in the competition for outlets. Isaly early faced a problem most manufacturers still face—how can maximum volume be obtained without dangerous credit losses? How can retailers be taught to merchandise efficiently?

Isaly attempted to solve these problems in Youngstown, Ohio, where the company was already intrenched in the community with a profitable retail milk route. Here, in 1918, Isaly built a large capacity plant to supply ice cream and dairy products to the company's own retail stores. The first outlet was a huge retail salesroom in the plant itself followed by several retail stores in the business district of Youngstown. Isaly now has plants in Pittsburgh, Pa., Youngstown, Mansfield, Marion and Columbus, Ohio; branches in Canton, Akron

A nickel well spent.

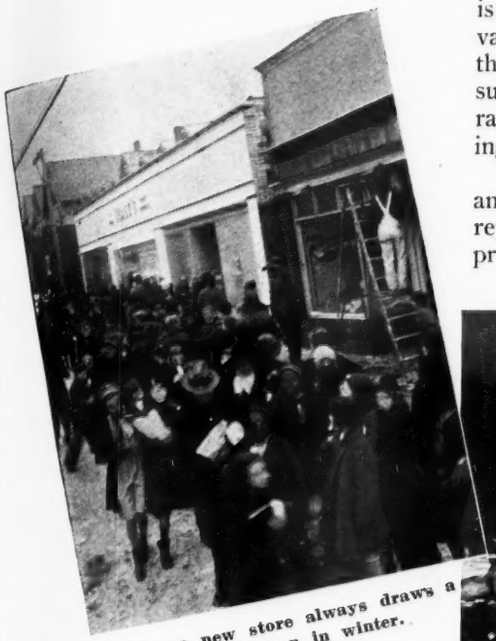
Age and dignity yield to the Isaly method.

and Upper Sandusky, Ohio; a plant in Fort Wayne, Ind., and one in Michigan. Within the 50-mile radius of the Ohio and Pennsylvania plants, Isaly will soon be operating 300 retail stores.

With the Youngstown expansion, wholesaling activities were largely abandoned. By the time the depression arrived the Isalys had learned that they could sell their entire plant output through their own retail stores, independent of the hazards of the retail milk route with its high distribution costs and credit risks.

The invasion of Pittsburgh in 1929 rounded out the Isaly merchandising plan. Here, Isaly invested heavily to build one of Pittsburgh's largest dairy plants, with no outlets for the sale of the plant's capacity other than twelve company owned retail stores.

At the very bottom of the depression the capacity of the dairy was doubled by adding to the original building and equipment. This additional capacity has been absorbed by more Isaly stores. The present Isaly investment in Pittsburgh of approximately 1½ million dollars includes plant, trucks and some 60 retail stores. In Pittsburgh, Isaly has added



Opening a new store always draws a huge crowd, even in winter.

new stores at the rate of about ten a year. When the depression was taking its greatest toll of business, Isaly was rapidly expanding by plowing back profits. Competitors were baffled.

In a highly competitive field one organization may gain the advantage over others because of: lower cost of raw material; lower cost of production; lower cost of distribution. These are the usual advantages; there are, however, others. What are the Isaly advantages? What is the secret of Isaly success?

The Pittsburgh and Youngstown plants of the Isaly company buy their milk requirements from Dairymen's Cooperative Sales Association which controls most of the available milk supply within a 75-mile radius of Pittsburgh. Isaly's Pittsburgh plant has no milk routes, sells only through owned retail stores and consequently buys raw material mostly in the ice cream manufacturing classification. Classification requirements would bring Isaly's price slightly below the Pittsburgh average, but to insure the good will of the producers pool and a steady flow of milk, Isaly pays a premium that varies from 10 to 15 per cent above its classification price average. This places Isaly's raw material costs very close to the average of all other dairies.

Isaly operates its own cream collecting routes, reaching well out from the plants. This buying, too, is on a competitive basis. Frequently Isaly is the price setter and voluntarily advances prices. Small wonder it has the good will of the producer. Isaly's success is neither due to low cost of raw materials nor a competitive buying advantage.

Isaly does operate most modern and efficient plants. Its equipment represents heavy investments in improved and expensive machinery, glass lined tanks, stainless steel evaporators, vacuum pans and continuous freezers. Isaly may gain some competitive advantage through superior plant operation; but it is a small advantage, if any.

In summer it takes a reserve cabinet of twenty 5-gal. cans to back up this counter cabinet.

ISALY GAINS no appreciable advantage at the expense of the producer neither does it gain at the expense of its employees. Many Isaly employees were interviewed and questioned during the study of Isaly methods. The loyalty of those behind the counter, on the trucks and in the plants was convincing. Many stated they were better paid than others in competing companies and all apparently anticipate the future they have with the Isaly Company. When a new store is opened, and this is increasingly regular, retail managers of other Isaly stores within 50 miles flock to the opening. They come to lend a hand if needed, but particularly to gather sales ideas, to observe any new equipment or improved methods of display. They are not required to come—they come because it is a privilege. A large portion of the successful selling of consumer goods depends on the point of sale effort. Unadvertised commodities have obtained generous distribution through no other means than skillful handling at the point of sale. At Isaly's, point of sale effort is highly developed. It is a function of employee loyalty.

Business success is generally attributed to good management. Certainly Isaly success might be so cataloged. This study, however, attempts to analyze the operations that merit the label "Good Management."

Isaly early learned that a large portion of the cost of dairy operations was the expense of distributing the products of the dairy either to the consumer's home or to the small retailer. Retail milk routes offered slow and limited expansion, and high credit risk. The dealer outlets offered greater expansion, but also greater credit risks. Expansion in either case was limited, costly and speculative.

Since 1912, Isaly has experimented with company-owned dairy stores, studied the merchandising problems and the consumer. When Isaly started its Youngstown plant it was ready to launch its program of plant output through owned and controlled retail dairy stores. Milk is a staple of diet, milk retailing is highly competitive, milk consumer habits are

definitely formed. Ice cream, therefore, was selected as the product most certain to carry Isaly retail store and plant volume to capacity. Isaly reasoned that if the ice cream volume through its own outlets could be stepped up to some eight or ten times the volume of the average drug or candy store, the saving in delivery costs would be quite considerable. It further reasoned that if this saving was passed on to the consumer in the form of larger servings, the necessary volume would be assured. This gave birth to the Isaly big, nickel ice cream cone.

The big ice cream cone has been a tough problem for ice cream makers and sellers alike. Competing dairies know Isaly can accumulate profits n slender margins, but to many the big ice cream cone looks too big for even slim margins. Some put mystery in the big cone and say it just looks big and wish they knew the trick. But the cone really is big.

During the study, cones from many Isaly stores were bought and weighed. When the cream was very hard the ice cream in the cone weighed between 3 and 3½ oz. When medium, 3 to 4 oz.; when slightly soft, 3½ to 4½ oz. Some "cone boys" cut larger cones than others but the ice cream in the average cone will weigh 3½ oz. or better. Nickel cones throughout the country averaged from 1½ to 2½ oz. of ice cream.

The ice cream cone, popularized by the World's Fair of 1904, has been a child's favorite ever since. Youngsters hesitate not at all at eating anything, any place, any time. Inhibited oldsters, however, who even might be caught chewing gum in public, stop short of eating as they walk along the street. Sophisticated grown-ups eat their ice cream at home or seated at a table in an ice cream parlor. Dished ice cream carries heavy overhead—dishes, silver, tables, chairs, waitresses, washers and floor space. Ice cream cones are generally carried out and eaten on the street. To obtain the required volume for Isaly stores every one must eat ice cream cones. Here was one of the problems of the first Isaly retail stores. Today snooty Squirrel Hill and sophisticated Mount Lebanon districts of Pittsburgh take their cones on the run, munch them while shopping and consume them in quantities while riding on hot summer nights. At the time of new store openings, Isaly thaws out all inhibitions. Free cones are given away as fast as they can be scooped out.

Plenty of impulse power in the front display in each Isaly store.

First come the kiddies, soon follow the high-schoolers. They line up for blocks to await their turn. The big free cones are given away as fast as 10 to 40 "scoopers" can dig them out. By the time one cone is down, the youngsters are back in line for another. Toddlers want their cones too, and mother or father must bring them. Grown-ups do not have to wait in line. Soon mothers and fathers come streaming out struggling to pilot the offspring and gnaw down a big cone. Before the show is over, many oldsters, who have sampled of their own accord, amble down the street munching without embarrassment.

From 10,000 to 20,000 cones are given away at most Isaly new store openings. Often at the big store or plant salesroom openings twice this number of cones are required to satisfy the whetted appetites of the long line of waiters.

THERE IS A SUSPICION among competing dairy manufacturers that Isaly runs in luck—that its many ventures just happen to click. They cite the great fortune Isaly has in its unique name. They also point out the Pittsburgh plant location as a break of chance. Isaly chose a plant site on the heaviest traffic artery in the city, and planned the building location flush with the sidewalk. But building laws forced the building to be erected far back from the sidewalk, thus providing enormous parking space in front of and at the side of the plant retail sales room. In summer the parking space is jammed. The retail sales at the plant have exceeded expectancy. The facts are: Isaly neither locates nor operates by guess. Each Isaly outlet is chosen where the traffic load justifies a store. Plant locations, too, are the result of long and meticulous study.

The Isaly stores are all alike. The white fronts resemble marble and bear the company name in black. Inside, the trim is green and white. All fixtures are stainless steel, black trimmed. Store arrangement is carefully planned. The consumer passes impressive displays of slow-moving merchandise on the way to the ice cream counter. Ice cream is the big traffic item and accounts for approximately 60 per cent of the Isaly store volume. Many an impulse sale of cheese, cold cuts or delicatessen results from the purchase of an ice cream cone. Even the cafeteria in the rear of most Isaly stores, serving coffee, sandwiches and delicatessen, provides the impulse that creates additional dairy product sales.

The ice cream volume of the average Isaly store can be estimated by the size of the ice cream cabinet. Counter service cabinets hold between 40 and 80 5-gal. containers. A reserve cabinet of at least half this capacity is in the rear or basement of each store. During the summer Isaly stores will sell from 200 gal. to as much as 1,000 gal. per store per day depending on the size of the store and the location.

For the country as a whole ice cream sales fall off in winter to about a fourth the summer volume. In the winter Isaly volume drops off to a little less than one-half the summer sales, for the cone-eating habit hangs on even when the snow flies. However, Isaly's biggest volume sellers in the winter are packaged ice cream and butter.

Isaly operates its retail stores on slender margins. Isaly can afford a slender margin, for ice cream sales in its stores have a turnover almost daily throughout the year including Sundays. Stale ice cream has lost many customers for the corner drug store and the confectionery store. Isaly ice cream is here today and gone tomorrow. It has no time to be anything but fresh.

Isaly prices are low, but strangely enough Isaly is not a market wrecker. The Isaly market is largely created. This is the view of competitors who, at first, feared and somewhat felt Isaly competition. When Isaly enters a market, merchandising methods of all stores speed up and improve. Most nearby ice cream dispensers soon imitate the Isaly cone and increase the size of all portions served. They dress up, clean up and pep up, and are surprised to derive increasing sales in spite of their next door neighbor—Isaly. Yet the Isaly business goes on just the same. One of Pittsburgh's largest dairies has during the last year shown a large increase in sales to outlets they serve in the same block with Isaly stores. Isaly may have taken some business from competitors, but its following is largely created. This statement is substantiated by Pennsylvania State gallonage reports of the Department of Internal Affairs. Between 1932 and 1935 ice cream gallonage increased in Pennsylvania, 23.2 per cent; in Philadelphia 11.5 per cent; in Pittsburgh (Allegheny Co.) 46.6 per cent.

The Isaly company throughout its history had criticized the independent retail stores it served because of the untidiness and lack of sanitation. When Isaly entered the retail field it opened spotless little places. The same store that satisfies the most discriminating and exclusive neighborhoods of Pittsburgh is found in the lowliest mill districts. What is good enough for the select community is none too costly for the slums. The volume of business proves the point. One palatial independently owned and operated Isaly dairy store, in a district existing on script, lived profitably through the depression, while nearby retail stores of all kinds folded up. Whether in slum or exclusive suburb, each store is an expensive investment and must justify its existence by volume sales.

An intermediate step between wholesaling and operating Isaly owned retail stores was the trial of manager owned and operated stores. Though the company stores have been in general most successful, nevertheless 71 of the stores in the Youngstown area are manager owned and operated today. Isaly only requires of independents that they maintain a minimum distribution, keep their stores clean and pay their bills promptly. In all Isaly store operations the cash is in the till every night. There is no credit—there are no delinquents. As a result, managers and employees of the independent stores are as loyal to the Isaly company as the company's own employees. Isaly expects prompt payment from its independents, for they themselves are prompt in payment, availing themselves of every cash discount.

Much of the success of the Isaly institution results from the Isaly brothers constant contact with the consumer. To find an Isaly look for him in the retail store, and expect to find him eating an ice cream cone. Yes, the Isalys eat their own product. Thus they check flavor and freshness. Besides, it is good merchandising. Look for an Isaly behind the counter—he'll be there because customers like it and the Isalys learn from their customers.

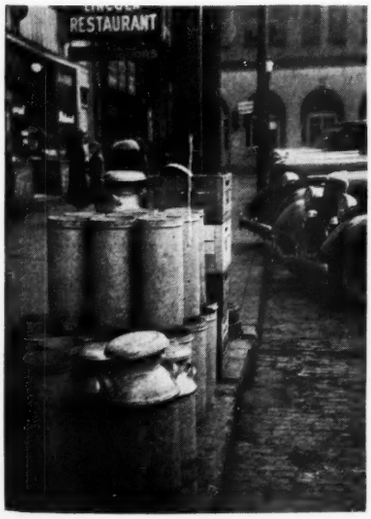
Some businesses gain a temporary spurt by selling an inferior product at reduced prices. However, the quality of ice cream and dairy products is fixed by law. Standards are zealously guarded. Cities, counties and states maintain health departments that inspect all dairies and their products. Isaly dairies have a clean record with these departments. Beyond the requirements of law the quality of a dairy product is a matter of personal taste. For those who prefer one product that product is quality. This is one reason why Isaly can create and maintain a separate market. It builds a market that prefers Isaly flavor and quality.

Each week the flavor combinations of the brick ice creams are changed. Isaly features variety, carrying in a single store as many as 25 different ice cream flavors and colors. In the negro section rainbow ice cream, a mixture of many colors and flavors is the rage and best seller. A flavor that is preferred in one locality may be neglected in another. Slow movers are soon replaced.

A FEW ice cream manufacturers have been fascinated by the apparent gallon price realized by Isaly. Four quart-bricks, at 29 cents each, brings $1.16 per gallon. They fail to see the extremely high investment of the Isalys in retail store equipment and the attendant overhead. They also fail to recognize the much greater investment in merchandising experience. They never count the years, as well as the dollars, invested in building a reputation with the consumer. Not every one can apply Isaly methods. Seasoned Isaly employees familiar with every phase of the Isaly methods, have attempted to crash into new and promising territories, confident of huge success in their own venture. They have all failed. Isaly expansion is creative, even educational. Isaly expands into new territories only as its reputation and acceptance of its products has traveled before it. This is the principal reason imitators fail to duplicate its success.

The number of imitators is a fair measure of success. Isaly's retail store imitators, plentiful in each of its many territories, have never been a serious threat. The good will of the leading manufacturing competitors, milk producers, employees and consumers results only from good management and sound merchandising.

Many manufacturers invest widely and heavily to perfect their product and the method of producing it—then hope for its sale at a profit. Of course, few manufacturers can follow the Isaly example and provide owned retail outlets for their products. Few manufacturers there are, however, who can not improve their merchandising and distribution methods if they but live closer to the consumer.



The evidence: one day's sale in midwinter included 120 gal. of bulk ice cream in addition to packaged cream and other items.

The Open Channel VS. Outside Negotiators

A Look at a Basic Cause of Labor Strife

By L. V. BURTON
Editor, FOOD INDUSTRIES

A NATURAL AND NORMAL CHANNEL of communication should exist between employees and management in any business. This channel is through the successive levels of authority between the workers and those at the top. Where this natural channel of communication is open and there is a ready exchange of ideas and desires from bottom to top, in such a place is to be found the indispensible basis of good employee relations.

If this natural channel of communication becomes clogged, or if it becomes completely obstructed, then the situation exists where the outside spokesman finds a ready market in which to sell his services. Those in the ranks of industry have been so encouraged by Congressional action in recent years to communicate with management via the outside spokesman that their views are going to reach those at the top by one method or the other.

Either management and employees will communicate by the natural channel, or that failing, the workers will engage outside spokesmen who have no responsibility for the success of the business enterprise. The outside spokesman, regardless of the form of union he represents, gets his pay from the membership of his own union and he will have a job only as long as he renders a tangible service to his members.

To say that there is no known substitute for good employee relationship is to repeat something that should be known to everyone and is repeated elsewhere in this publication. A labor union is not such a substitute, though it may be a very effective means to induce management to study its own employee relation set-up, to correct any fault that may exist. Unions do not correct such situations. They only act as a channel of communication where the normal channel is not functioning properly. Only management can effect the changes that are necessary.

Whether the channel of communication is wholly informal from worker to foreman, to superintendent, to management, or if it is an employee representation plan, an A. F. of L. union, or a C.I.O. union, it is only a medium of expression of a common will—a means to convey information through to management. It is not necessary, however, for management to wait for a spokesman from outside the organization before it begins to put its house in order.

If the natural channel of communication inside the organization is open, it is likely that happy conditions will prevail. But if it is closed, if there is a bottleneck, the urge to communicate with management will find expression outside the company.

An expert in this field of work has said that in every dispute he has ever investigated, he has found an obstacle to the communication of ideas somewhere along the line. Often the "tops" in such a company were wholly ignorant of the existence of the obstacle and consequently ignorant of the unrest that was developing because the employees' views could not be brought to the attention of management in the normal and natural manner.

PRESUME FOR A MOMENT that there is no clear channel of communication between workers and management in your own plant. If an outsider comes along who wants the job as spokesman for the plant organization, what does he have to offer in exchange for the money he will ultimately insist on collecting from his new customers? Such a man is usually described as a labor organizer. He goes to work in his own peculiar way until he gets a following. He will lend an attentive ear to the workers' problems, even if management will not or does not. He will do it because he expects to get paid for it.

Sometimes he is a salaried salesman from one of the A. F. of L. unions. Sometimes he draws his pay from the C.I.O. Sometimes he is just a young fellow trying to get along and starts a "spokesman business" of his own on his own capital. As such, he may be operating with a sincere conviction that he is doing something to help his fellowman—or, he may be just an adventurer hoping that he will demonstrate his power of salesmanship to such an extent that one of the bigger organizations will take him on and guarantee their aid and a respectable salary.

C.I.O., with headquarters in Washington, is often blamed for most of the recent sit-down strikes. As a matter of fact, most of them have not been officially ordered. Many of them which have the appearance of spontaneity are the work of the independent organizers of the type just described. They have discovered the places where management has failed to keep open the interior channels of communication. The independent organizer may have no affiliations with either A.F. of L. or C.I.O., though he may claim he has the sponsorship of one or the other. The probabilities are at the present time that he

will claim C.I.O. sponsorship. Maybe he actually has it. Maybe he will get it later. If he is a good salesman and if the local situation involves conditions where his form of service is welcomed by many workers, it is likely that the C.I.O. may step in to help him out. For C.I.O. is undertaking a big job in its efforts to organize all mass production industry. It needs money. A few thousand more workers paying dues will help to meet the expenses.

It is perfectly understandable how a sympathetic outsider who puts on a good act can secure an audience of large size in an industrial family where poorly functioning channels of communication exist. But it is equally doubtful whether the worker realizes where the money is coming from that pays the salaries of their newly formed friends. Ultimately, of course, the worker will pay it himself.

In the case of the recent automobile sit-down strikes, the money came from the Treasury of the United Mine Workers of America, of which Mr. John L. Lewis is president. His union contributed the sum of $500,000 to finance the organization drive. And at the present time, the miners are each paying a special assessment of $1 a month to continue to finance the drive, this sum being in addition to the regular union dues. The coming C.I.O. drive to organize the textile industry is to be financed by a half million appropriated by the Amalgamated Clothing Workers of America, headed by Sidney Hillman.

Though it is a long way from coal mining to manufacturing, and though conditions differ markedly, it is worth the time to observe how the U.M.W.A. operates, for here is where John L. Lewis has functioned as a union leader for a great many years. It would appear that those methods which he has found to be successful in his previous experience will at least be given a trial in those other industries where his advance men may be successful in selling the C.I.O. idea of spokesmanship.

In the coal mining industry the U.M.W.A. would be unable to exist in anything like its present state without the method of collecting dues known as the "check-off." By this method the coal operators who are under contract with unions agree to deduct the regular dues and the special assessments from the pay due to the workers. The miner never himself sees the money which is paid into his union treasury. And he has relatively little choice in the matter. Space does not permit any explanation of the history of the "check-off." It is one of the unsavory chapters of American industrial history. But the "check-off" is frequently proposed as a method of collecting dues in other industries when "demands" are presented.

In order to get a first-hand picture of the activities of U.M.W.A. as they are now conducted, I sat in two of the few open meetings of the recent Appalachian Bituminous Coal Conference where the union contract was being negotiated with the coal mine operators. To an outsider, the most impressive fact was the iron discipline that ruled the miners' representatives. During the long and tedious wait for the report of the "Committee of 16", who conducted the actual wage negotiations, the mine owners milled about the hotel, much as any business men at a convention. But for the most part the union men remained seated in a group on their own side of the general conference room for hours at a time. Only a few got up to stretch their legs and then resumed their places. The general conference for final ratification had been postponed repeatedly. Negotiations lasted from Feb. 17 to April 2. Each time a postponement was announced, the U.M.W.A. Sergeant-at-Arms used the following formula:

"Announcement. Mr. Lewis orders the delegates of the United Mine Workers of America to assemble here tomorrow at 1:30 p.m." He did not ask. He did not request. He *ordered*. And the delegates waited for the order and obeyed without question or without any further explanation.

Military discipline in the U.S. Army during the World War was not more effective than it was here. And, to an outsider, the mine operators were noticeably lacking in discipline or united front.

ANOTHER ASPECT of C.I.O. activities which is quite comparable to the problems of business is their own difficulty in finding suitable employees for executive positions. C.I.O. is actually facing an employment problem! Like ordinary business, they are finding it a big job to hire executives and administrators who are capable of carrying on without losing their gains. Because of the rapid increase in the number of employees of C.I.O. in their organizing drives, they have not been able to pay the usual large salaries until more dues commence to come in. Which makes it doubly hard to get capable men. Good labor executives must be good salesmen, and good salesmen get high salaries.

It is of passing interest to note that Mr. Lee Pressman who signed as general counsel of the Steel Workers Organizing Committee of C.I.O. and has served in a similar capacity in other wage agreements, was former assistant general counsel of AAA. Some may derive a wan smile from the fact that Mr. Pressman is brother-in-law of Jerome Frank, former general counsel of AAA.

At the close of the coal conference I managed to get a few words with Mr. Lewis, and asked him to explain the broad objectives of C.I.O.

"The worker," said he, "is entitled to a fair share of the profits arising from the increased efficiency of industry. If the stockholders take all the profits, the worker gets none of them, and his buying power is thereby destroyed. We believe that a more equal distribution of profits between workers and stockholders will make more business for all. The workers must share the benefits from the increase in efficiency of industry.

"WHEN A GENIUS COMES ALONG, whether he be a chemist or an engineer, and creates a much greater efficiency in industry, the stockholders are not entitled to all of the profits arising from his genius. Something has got to be done about the workers who are displaced when one man plus a machine will do the work formerly done by 50 men."

How would an industry set up such a profit-sharing plan that would also insure the continuity of the business in bad times as well as good, Mr. Lewis was asked. But he did not answer it directly. He has a very disconcerting way of evading an answer to a question he does not want to answer by starting a new discussion on a subject where the questioner often may have no knowledge, where it is difficult to argue, or where argument is wholly futile. Witness his reply to the question:

"I don't know. Look at the Goodyear Rubber Company. Santa Claus has visited the stockholders of that company 96 times.* If a man owned 100 shares of stock at the start, he would now own 9,600 shares. And he would have had all his dividends, too. What did the worker get in that period? I'll tell you. In the same

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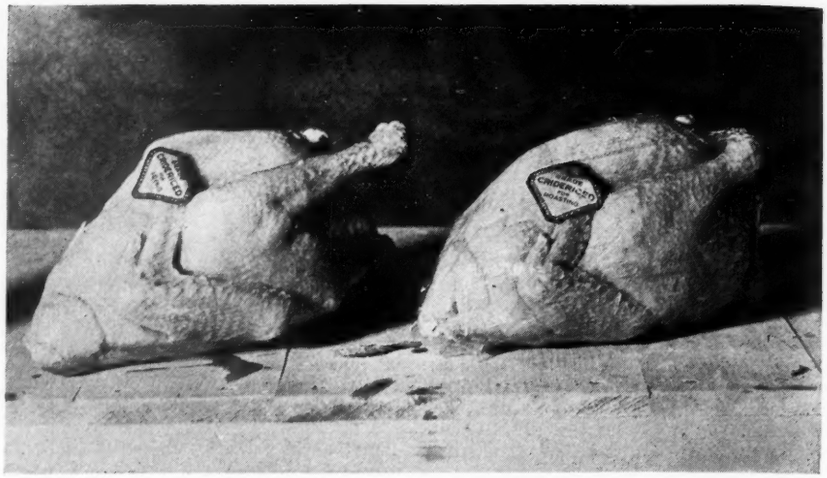
* See footnote on page 283.



Freezing Poultry

From the

Brine at –3 to –5 deg. F. is pumped through fully dressed fowls to freeze them quickly and cheaply

IN ITS FREEZING OF POULTRY by the "Cridericed" process (U.S. Patent No. 1,797,606 granted to John N. Crider) the Progress Packing Co., Chambersburg, Pa., is reversing the procedure followed in other food freezing systems.

The Crider system is based on the principle of having the freezing action proceed from the inside of the object being frozen instead of from the outside. Freezing by this method is accomplished by circulating the refrigerant through paraffined paper tubes inserted through the object.

The Crider method is particularly applicable to drawn poultry. For production as well as sanitary and marketing purposes the fowls are fully dressed and the freezing operation is carried out in a room held at approximately 32 deg. F.

From the production viewpoint full dressing of the fowl makes possible the correct insertion of the paraffined paper tube to get the quickest and most economical freezing. As shown in Fig. 3, the tube is inserted into the body of the fowl through the skin of the neck and through the crop opening between the neck and the wish bone. It passes in a continuous manner through the body of the fowl to come out at the vent opening through which the internal organs have been removed.

After the tube has been inserted, the cleaned and washed giblets, the bony part of the neck from which the head is cut, and a small quantity of clear drinkable water are placed in the cavity of the fowl surrounding the tube. The filling in of this cavity serves the two purposes of keeping the edible giblets and neck length with the fowl of which they are parts and of establishing a means of getting the freezing temperatures from the walls of the tube to the body of the fowl. If this continuous contact were not made the freezing time would be much longer and the degree of freezing irregular because any air filled space which might separate the fowl from the walls of the tube would have an insulating effect, while the part of the fowl which might come in contact with the tube would freeze quickly. To make certain that the water and giblets will be held in the body cavity until frozen the skin at the neck end of the fowl is drawn snugly around the protruding end of the tube and held tightly in place with a rubber band. The vent opening is closed by the skin and fat freezing to the walls of the tube.

In addition to forming a continuous contact between the walls of the tube and the fowl, the filling and closing of the cavity in the fowl prevents the circulation of air, which would both dry out the fowl and increase the likelihood of bacterial contamination and spoilage.

Another detail in the preparation of the fowl for freezing is the care with which the fowl is handled in the dressing operations to avoid tearing or breaking of the skin or separating the skin from the flesh of the fowl. While tearing or breaking of skin gives an unattractive appearance to the frozen fowl, separation of the skin from the flesh is likely to cause ice blisters or lumps on the outside of the fowl. Either type of defect lowers the market value of the poultry.

Up to the actual freezing room, the slaughtering, dressing, and drawing of poultry for the Crider method of freezing are carried out very little, if any, differently from in any first-class or high-grade poultry packing establishment. These operations are carried out on a straight-line, continuous production basis and the fowl goes to the freezing room still warm with its natural body heat. This permits shaping of the fowl into the

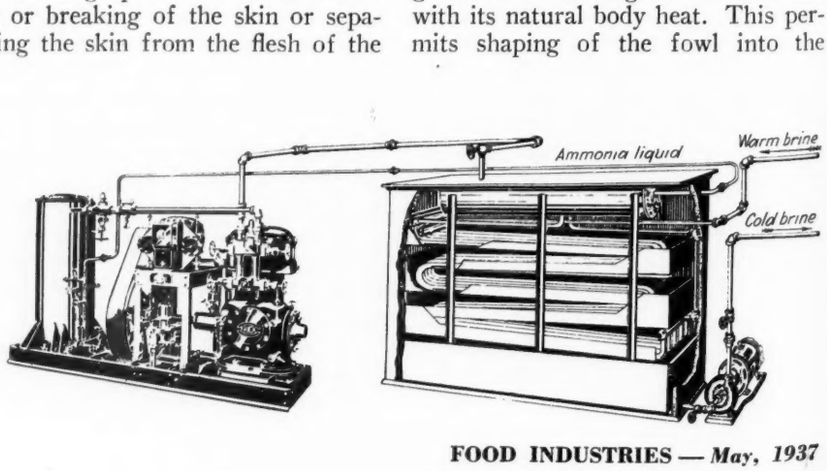


Fig. 1—Brine for freezing the fowls is kept at —3 to —5 deg. F. by a cabinet type coil and trough cooler refrigerated by a direct expansion ammonia system operating from a standard single stage compressor.

freezing form and fixes the natural fresh flavor and bloom in the skin and meat of the fowl.

With the aid of Frick Co. engineers, the Crider method of freezing has been put on a plant production basis for the Progress Packing Co. through the designing of special equipment on which the fowls are mounted for the passage of the sodium chloride brine through the tube and the shaping of the fowl to give it a good marketable appearance.

The special equipment as shown in Fig. 2 consists of a series of non-breakable cast aluminum forms detachably mounted on a frame supporting the brine supply and drain lines. The supply line is connected with the main drain line by rubber tubing and the paraffined paper tubes

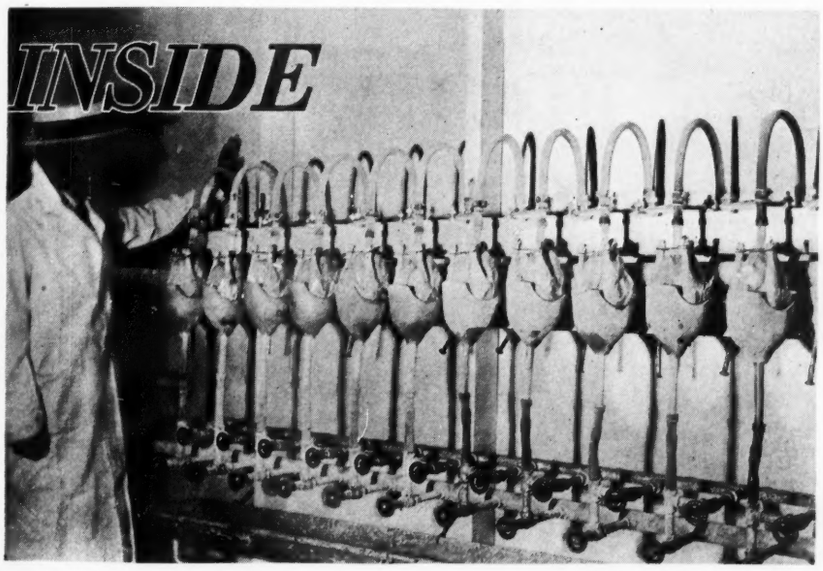


Fig. 2—Brine from the supply line flows gently but continuously up through the rubber connections and the paraffined tubes which extend through the fowls held in a vertical position by the cast aluminum forms. It overflows into a drain line which returns it to the brine cooling system.

passing through the fowl in the aluminum forms. The rubber tubing connections are not only resistant to the corrosive action of the brine but are also flexible to permit adjustments in the position of the fowls in the aluminum forms to assure a central perpendicular position of the paraffined paper tube. This central perpendicular position is important in that the tube should be as equidistant as possible from the walls of the cavity of the fowl.

Pressure of brine in the supply line is held at approximately 20 lb. per sq.in. pressure by an electrically driven centrifugal pump with a capacity of 25 gal. per min. Through valve connections this brine is distributed throughout the system to get as near uniform flow of brine through each fowl as possible. By means of a valved bypass connection, each line supplying brine to the fowls is tied into a secondary brine drain line on an approximate level with the main brine supply line. This secondary drain line permits suction draining of the brine out of the tube for any fowl which is ready to be taken off the freezing line.

The aluminum forms have the double purpose of supporting the fowl during freezing and of shaping the fowl to give it a trussed form when the freezing operation is ended. A 10x10 in. moisture-proof Sylphrap sheet is fitted about the neck, breast and wings of each fowl to keep the skin of the fowl from freezing fast to the forms; the aluminum forms are in three sizes to shape chickens ranging from 1 to 7 lb. in weight. For turkeys and other fowls the forms are correspondingly larger.

The brine used as the freezing medium is made from an edible grade of sodium chloride so that no undesirable taste will be imparted to the fowl in case an accident or a pin hole leak in the paper tube permits the brine to come in contact with the fowl. This brine has a salometer density reading of 86.8 at 59 deg. F. which corresponds to 23 per cent sodium chloride by weight and permits cooling to —5 deg. F. without solidifying. In the Chambersburg plant the "Cridericed" process operates between the temperatures of —3 and —5 deg. F. These limits are held by the "make" and "break" points of an automatic thermostatically controlled brine cooling unit. Within this temperature range the time of freezing varies from 15—18 minutes for broilers of about 1½ lb. weight to 30—35 min. for fowls of about 4 lb. weight. The length of the longer freezing period is influenced to some extent by the shape of the fowl as well as by the position of the tube and by the temperature and rate of flow of the brine. At the end of this freezing period the fowl is removed from the Crider freezing unit, tagged for identification as to type and grade of fowl and placed in a cold room held at 0 deg. F. to finish the freezing. This room in the processing of "Cridericed" poultry serves the same purpose as the hardening room for ice cream.

While the fowl could be frozen solidly throughout while on the brine line the freezing time would be for such a prolonged period that produc-

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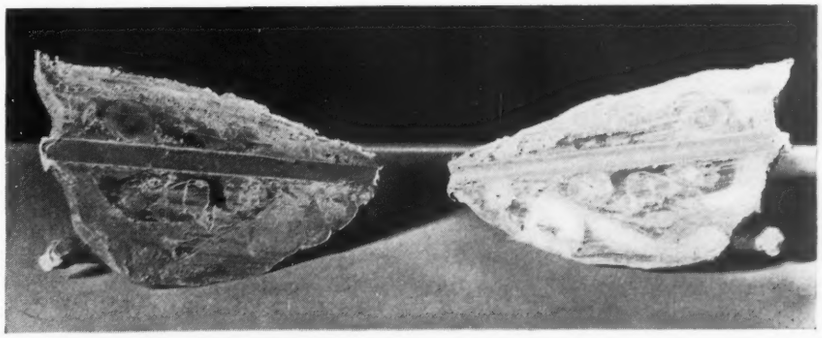
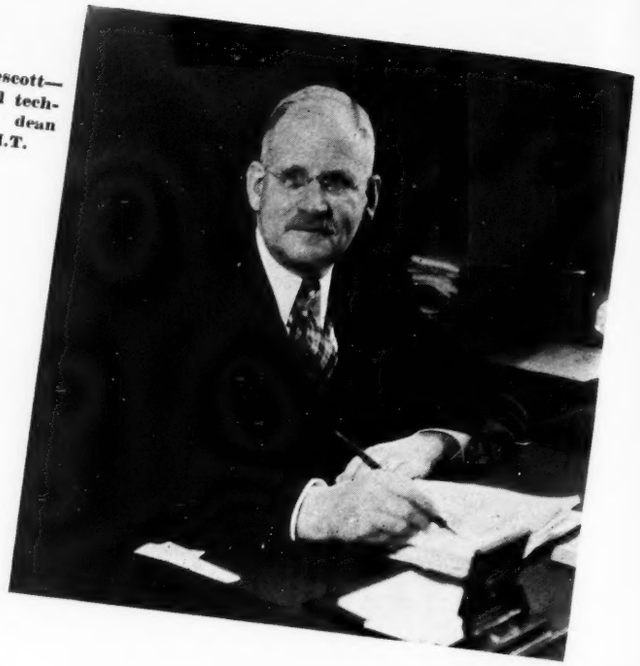


Fig. 3—Chicken frozen by the "Cridericed" process sectioned lengthwise to show location of the paraffined paper tube through which the —3 to —5 deg. F. brine flows, and of the giblets and ice in the body cavity of the drawn fowl.



Dr. Samuel C. Prescott—Founder of the food technology course and dean of science at M.I.T.

How FOOD TECHNOLOGISTS Are Made

Young men are being trained for successful careers in the food industries by a four-year course at M.I.T.

By BERNARD E. PROCTOR
Massachusetts Institute of Technology
Cambridge, Mass.

THE FUTURE of the 15-billion dollar industry handling and processing food products will be intimately associated with and dependent upon science and its applications. And the men holding responsible positions in the various food companies are likely to be those with technical training which enables them better to cope with the problems that must be faced and solved.

For the express purpose of training young men who intend to make a career in foods a definite objective in life, the Massachusetts Institute of Technology has laid out a four-year course. Of comparatively recent origin, this course at well-known, 76-year old Boston Tech requires the same insistence on fundamentals in mathematics, chemistry, physics and English as the older scientific courses. But it is different in that knowledge of *foods,* and the *scientific and technological aspects of food manufacturing and handling from the biological, chemical and engineering standpoints* are stressed in the last two of the four years.

This four-year curriculum for food technologists was inaugurated by Prof. Samuel C. Prescott, head of the Department of Biology and Public Health and for the past six years Dean of Science. Those in the technical branches of the food industry are familiar with the numerous interests which Dean Prescott has displayed in the research and other problems of foods. *[1]

*[1] In 1898, Dr. Prescott's publication, with Mr. Lyman Underwood, of their researches describing and explaining the bacteriological causes of spoilage in canned corn, followed by similar studies in regard to canned peas in 1899, opened wide vistas for the application of microbiology in food preservation. He was one of the leaders in the supervision and sanitary control of milk supplies. After starting one of the first biochemical laboratories in the country, he established the research laboratory of the rapidly developing United Fruit Co. and acted as its first director. During the World War he was in charge of all governmental food dehydration and research. In the years after the War he was particularly identified with research concerning coffee, his report on which has gone all over the globe; and concerned with the study of food refrigeration, in addition to his academic duties. Over the entire period he has been prominent in the field of public health, sanitation and the many applications of biochemistry and microbiology.

▶ ***Some day it will take more training than a background of experience to hold the best jobs in the food industries. Trained food engineers or food technologists will operate the food plants of the future. And their training will be something like the course described here.***

All Food Manufacturers

The curriculum was established on the principle that the food industries had a definite need for men having a sound basic scientific training in the physical sciences, on which there could be superimposed a specialized training in the biological, chemical and technological aspects of foods. This premise has been substantiated by a recent survey made of the graduates of this course, which shows that the majority have made encouraging progress in the widely diversified industries and research organizations with which they have become affiliated.

It is also of interest to note that in 1935 an appeal was made in England for the establishment of a university course of instruction in food technology with the same general objective, although with the idea of it being a post-graduate course.*[2] At M.I.T. the course is primarily for undergraduates and leads to a Bachelor of Science degree, but with other similar subjects of a more advanced nature available for post-graduate study and research. It is interesting to note, however, that a number of graduates of other colleges have taken the undergraduate work, as

*[2] Cronshaw, H. B. *Chemistry and Industry,* 13, 192, 1935.

the material covered in it was apparently not available elsewhere.

The curriculum for the entire four-year undergraduate course is outlined in Table I.

Table I—Curriculum for Food Technology Course at M.I.T.

1st Semester	2d Semester
FIRST YEAR	
Chemistry, General	Chemistry, General
Physics	Physics
Engineering Drawing	Descriptive Geometry
English Composition	English Composition
Calculus	Calculus
Military Science	Military Science
Physical Training	Physical Training
SECOND YEAR	
Qualitative Analysis	Quantitative Analysis
Biology, General	Botany
Physics	Comparative Anatomy
Literature and History	Physics
Calculus Military Science	Literature and History
General Study	Military Science
REQUIRED DURING SUMMER	
Organic Chemistry	
Organic Chemistry Laboratory	
THIRD YEAR	
Chemistry of Water & Sewage	Chemistry of Foods
Physical Chemistry	Physiology
Biology of Food Supplies	Bacteriology
Bacteriology	Plant Diseases
Technology of Food Supplies	Municipal Sanitation
Political Economy	Technology of Food Supplies
General Study	Political Economy
FOURTH YEAR	
Food Engineering	Food Engineering
Personal Hygiene & Nutrition	Industrial Microbiology
Industrial Microbiology	Industrial Hygiene
Technology of Food Products	Technology of Food Products
Biochemistry	Thesis
General Study	General Study
Thesis or Elective	

The first year for all engineers, chemists, physicists and biologists is identical. The freshman work is fundamental, serving as a broad foundation for future professional study.

The second-year curriculum in the food technology and industrial-biology option introduces the basic biological knowledge necessary for the complete understanding of the various characteristics of plants and animals which make up our food supplies. At the same time the curriculum continues the mathematics, physics and chemistry, which are essential to scientific work in any field today. The summer between the second and third year is devoted to an intensive course in organic chemistry especially for this group of students.

The third-year curriculum requires courses in the chemistry of water and sewage, as well as in food chemistry, bacteriology, physiology, plant diseases, municipal sanitation and political economy. At the same time the courses in technology of food supplies take up the economics and geography of foods, together with considerations of food storage and transportation, packing house practice, sugar refining, milling, dairy technology, the fisheries and similar fundamental industries.

While the instruction in these courses is based upon science, the practical application of the knowledge gained is by no means neglected. Take the course in packing house practice as an example. The students take the carcass of a hog, cut it up, salt, "pump" and pickle the various parts, and smoke the hams, and render and clarify some of the fat. Other phases of meat plant operation, such as sausage making and governmental inspection, are observed on special trips through commercial

(*Turn to page* 285)

Some Reference Books on Food Technology Used by Students in the M.I.T. Course

Associates of L. A. Rogers — Fundamentals of Dairy Science
Buechel — Commerce of Agriculture
The Canning Trade — A Complete Course in Canning
Clayton — Colloid Aspects of Food Chemistry and Technology
Clemen — By-Products in the Packing Industry
Cruess — Commercial Fruit and Vegetable Products
Hammer — Dairy Bacteriology
Hunziker — Condensed Milk and Milk Products
Kent-Jones — The Practice and Science of Bread-making
Mandeville, Pennington, Platt, Snyder — Eggs
Moulton — Meat Through the Microscope
Prescott and Winslow — Water Bacteriology
Tanner — The Microbiology of Foods
Tressler — Marine Products of Commerce
Tressler and Evers — The Freezing Preservation of Fruits, Fruit Juices and Vegetables
Winton — Structure and Composition of Foods
Weber and Alsberg — The American Vegetable Shortening Industry
Woodman — Food Analysis
Also
Prescott and Proctor — Food Technology (in press)

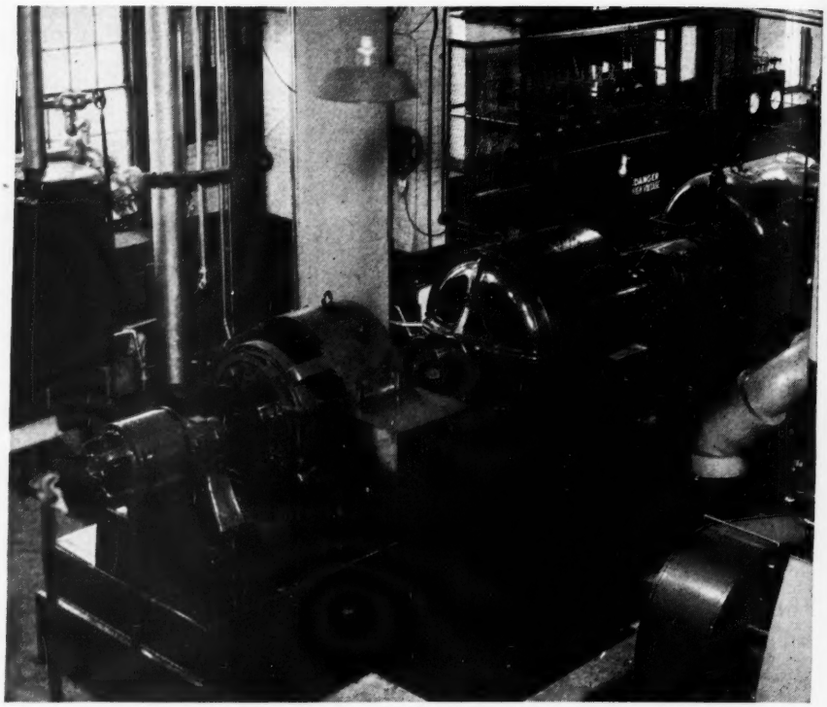
Experimental food dehydration (right) and an incubator for microbiological research at M.I.T.

Students conducting studies on homogenization in food technology laboratories at M.I.T.

Scientific processing of hams under controlled smoke-house conditions in food technology laboratories at M.I.T.

Brewers *Save* through

Installation of additional refrigeration capacity with equipment saved steam, lowered power cost. Air conditioning was added at same time



At the Narragansett brewery three generators are mounted on the shaft of a mixed pressure turbine, to supply both a.c. and d.c. electric power.

RAPIDLY INCREASING DEMAND for their products has recently caused several large breweries to install more refrigerating capacity. In two of these installations, the addition of this equipment has been so engineered as to result in a money-saving improvement in the use of steam. In one plant, equipment was also installed to provide air conditioning for the fermenting cellars and stock cellars.

Breweries where the changes have been made are the Narragansett Brewing Co., Providence, R. I., and P. Ballantine & Sons, Newark, N. J. Improvements of a generally similar nature are at present under way in the Schaefer brewery in Brooklyn, N. Y.

How this improved economy was obtained can be illustrated by a consideration of what was done at the Ballantine plant. This brewery, which had not operated as such during the period of prohibition, reopened after Repeal with its former boiler plant, which produced steam at 150 lb. gage pressure. It also had two 150 kw., 120 volt d.c. generators. These were driven by non-condensing Corliss engines. The pumps were of the direct-acting steam type.

Exhaust steam from the engines and pumps was used for heating water for processing and for feeding the boilers. Steam for processing was taken directly from the high pressure steam mains through reducing valves.

The engines in this brewery could not supply electric power enough to meet the full requirements, and the balance was obtained from the local public utility company.

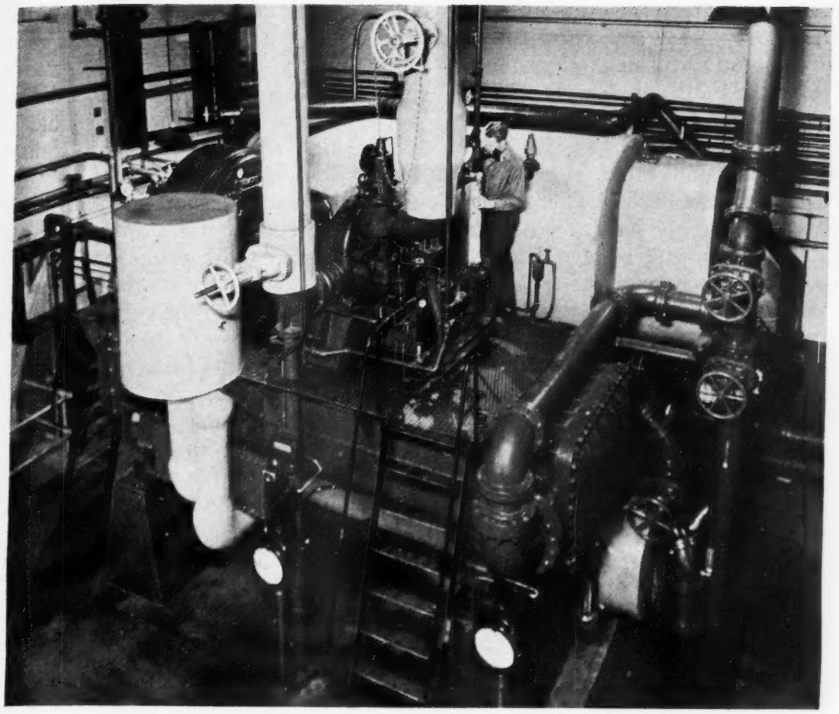
As the former refrigerating equipment had been removed while the plant was idle, new ammonia compressors were installed before beer making was recommenced. These were of the synchronous motor driven reciprocating type. The output of the brewery grew rapidly and about two years ago additional ammonia compressors of the same type were installed.

When last year still more refrigerating capacity became necessary, Fred Ophuls, consulting engineer for the brewery, considered at the same time the possibilities of reducing the overall power and steam costs per barrel of product made. It was decided to obtain the additional refrigerating capacity by putting in a turbine driven centrifugal refrigerating compressor with accessories, and a turbo-generator set for power production.

This decision was made as a means of improving the heat balance of the plant, that is, so that the plant would use as much as possible of the heat originally in the steam as it leaves the boilers. To get the best possible heat balance, it would be necessary to have a plant in which all the required power could be generated by reducing the pressure of the heating and process steam, in turbines or engines, from the initial high pressure at the boilers to the low pressure at which the steam was used in process. Such a balance is not possible in a brewery; but, with suitable equipment, a fairly efficient heat use can be attained.

▶ ***Refrigeration and process steam are essentials of many food processing activities, while all food plants use power in at least some operations. When the demand for these three services is balanced, so that the least possible waste occurs, the plant economy is naturally improved. This article describes how an approach to such a balance is being made in some breweries. Others who can follow this lead include manufacturers of***

Canned foods
Carbonated beverages
Confectionery and Chocolate
Dairy products
Ice cream
Meat and Fish products



Turbine driven centrifugal refrigerating compressor mounted on ammonia condenser and liquid ammonia receiver at a brewery.

Better Heat Balance

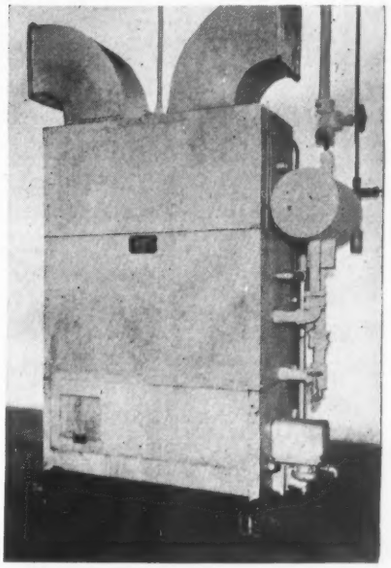
The centrifugal refrigerating unit installed is a Carrier machine of 350 ton rated capacity. This is driven by a Terry steam turbine, taking steam from the high pressure steam main at about 140 lb. gage pressure and exhausting directly to the process lines at the processing temperature of 30 lb. gage. This can be done with a turbine, as turbine exhaust is clean and free from oil, which is not the case with the exhaust from engines.

The turbo-generator set installed at the Ballantine brewery is of 450-kw. capacity, with a turbine of the mixed-pressure, extraction, condensing type.

The 30 lb. exhaust steam from the turbine which drives the refrigeration compresor ordinarily goes directly to process. When this exhaust steam is more than is needed, the excess is fed to the mixed-pressure turbine. When there is not enough of this 30 lb. exhaust, steam at the same pressure is extracted from the mixed-pressure turbine. When, at times of peak demand for processing steam, the exhaust from the one turbine and the extraction from the other are not enough, even when combined, live steam from the boilers, through a pressure reducing valve, makes up the balance. When 30 lb. steam from the compressor turbine is available and the electric power demand is low, this steam is sufficient to operate the turbo-generator set. For higher power demands, or periods when the 30 lb. steam is in demand for process and heating, the high pressure end of the mixed flow turbine is supplied with high pressure steam. Any steam not extracted from this mixed-pressure turbine for process work, passes through the low pressure part of the turbine, generating power there, and passes out to the condenser.

In making this change at the Ballantine brewery, the existing refrigerating coils and other equipment were retained. However, this equipment used anhydrous ammonia as a refrigerant and this ammonia was not suitable for use in the Carrier centrifugal compressor. So the new compressor uses Carrene No. 2 as a refrigerant. The Carrene, in turn, serves to cool and condense the ammonia which does the actual plant refrigerating work. In this method of operation the ammonia is used about as brine would be in a brine circulating refrigerating system. Liquid ammonia circulates through the various cooling coils and air conditioners, where it evaporates to a gas as it does its work of cooling. This gas is then drawn into a cooler, where the refrigerant from the centrifugal compressor, that is, the liquified Carrene, is sprayed over tubes through which the ammonia gas passes. As a result, the ammonia is condensed to a liquid again, and passes to the liquid receiver, from which it is again pumped into the circulating system.

Refrigerating in this way requires somewhat more compressor capacity than a system using but one refrigerant. This is so because the centrifugal compressor must produce a temperature about 10 deg F. lower than the temperature of the circulating ammonia, in order to liquefy this ammonia. The operating cost is said to be offset, however, by the greater mechanical efficiency of power transmission obtained by the turbine driving the centrifugal Carrene compressor, as compared to a turbine driving a reciprocating ammonia compressor through a V-belt, flat belt drive.



One of the unit coolers installed in a fermenting cellar at Narragansett brewery.

At the Narragansett brewery, the change made was about the same, allowing for some difference in the original refrigerating and power equipment. The steam flow diagram, Fig. 1, shows how the installation was made at Providence.

In this diagram it will be seen that the high pressure steam from the boilers goes to the turbine driving the compressor and to the mixed-pressure turbine driving the three generators. Low pressure steam from both turbines passes to process, or low pressure steam from the compressor turbine can flow to the mixed flow turbine. This arrangement is about as described for the Ballantine plant.

The refrigeration installation at the Narragansett is somewhat more complicated than that at the Ballantine brewery, because part of the refrigerating load can be carried by the old installation of reciprocating ammonia compressors. How the refrigeration is carried out with this dual system is shown in Fig. 2.

In this diagram it will be seen that the ammonia gas coming from the cooling coils and other refrigerated apparatus in the brewery enters an accumulator. This separates out any liquid ammonia and returns it to the liquid ammonia part of the cycle. The ammonia gas from the accumulator can go in part to the ammonia compressors to be condensed and handled in the conventional manner. The remainder of the ammonia gas goes to an ammonia condenser where it is cooled and condensed by the refrigerant from the centrifugal compressor, just as has already been described for the system at the Ballantine plant.

The new air conditioning installation at Providence consists of Carrier unit brine-spray coolers, conditioning eight fermenting and storage cellars. These control both temperature and humidity. The purpose of regulating humidity is to keep the cellars dry, as dampness promotes the growth of micro-organisms and may damage the quality of the beer.

Of the two plants described, only the Narragansett installation, which has been working for almost a year, is old enough to show what are the advantages of the hook-up. In this plant it has been found that the general heat balance has been improved because waste heat formerly lost from steam engine exhausts is now saved; the total steam requirements per unit of output have been reduced; exhaust steam from turbines can be used in process because it is not contaminated by engine oil as formerly; and condensing water, from both the turbines can be used in the plant, thus recovering its heat.

Other savings come from the balancing of live steam requirements with process steam requirements by means of the mixed-pressure turbine, and by the generation of all the plant's

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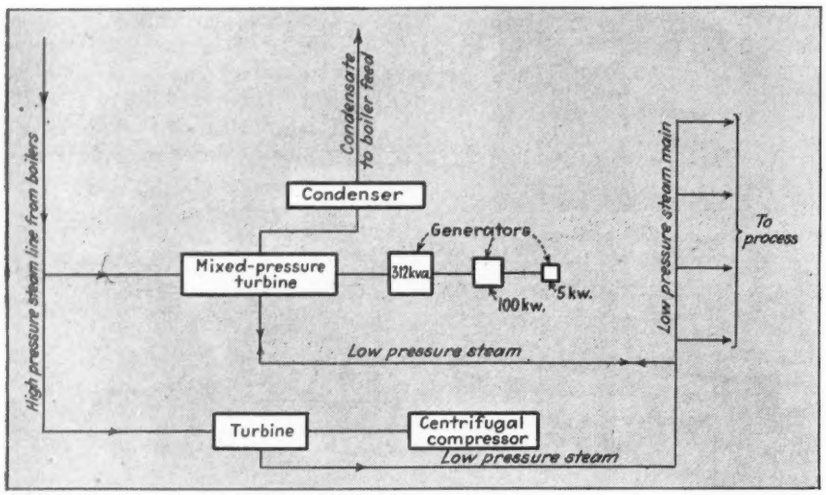


Fig. 1—Steam flow diagram for power, refrigeration and process steam installation at Narragansett Brewing Co., Providence, R. I.

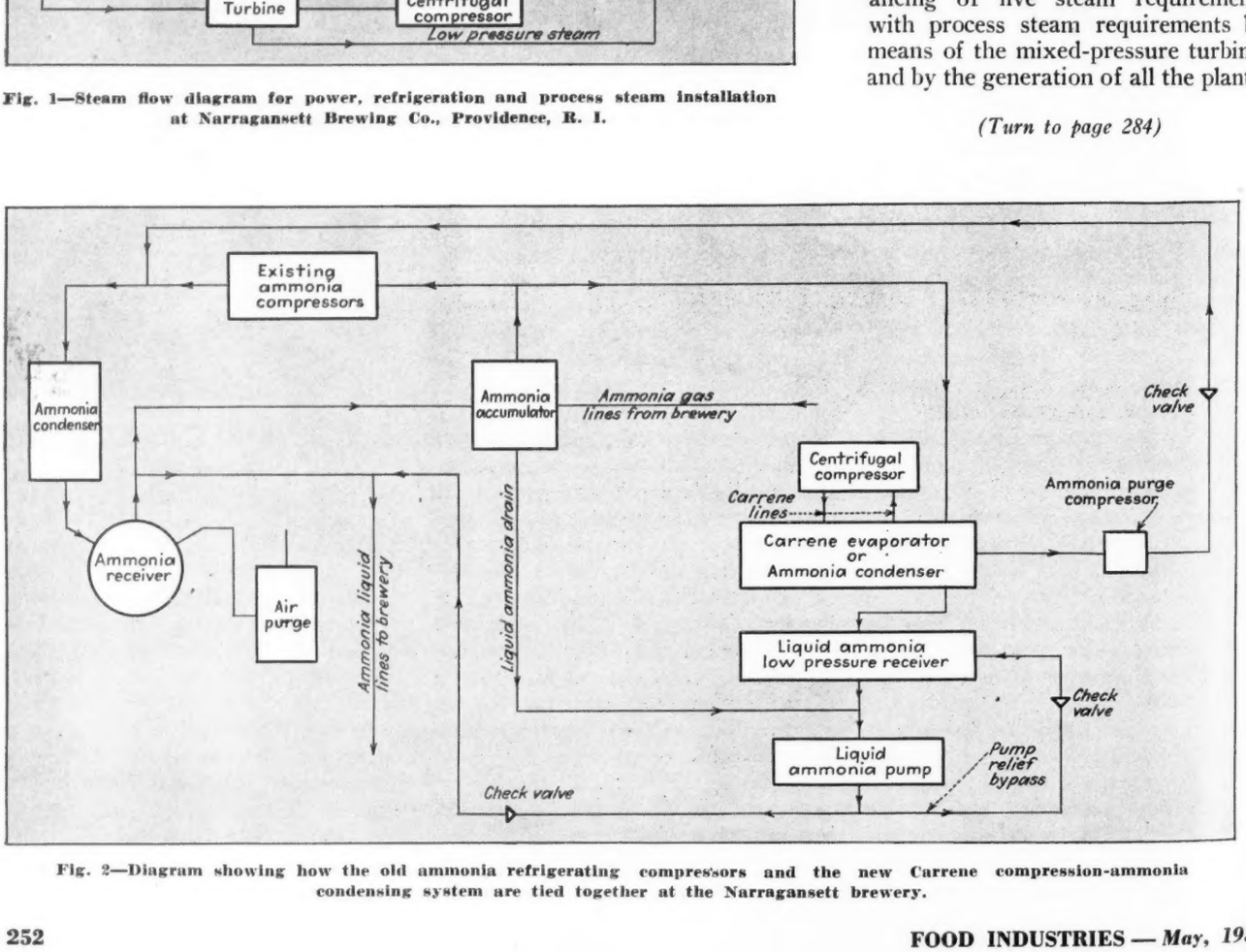


Fig. 2—Diagram showing how the old ammonia refrigerating compressors and the new Carrene compression-ammonia condensing system are tied together at the Narragansett brewery.

How Diastatic Malt Extract Is Made

By A. L. NUGEY
Consulting Engineer, Rahway, N. J.

▶ ***While operations, processes and equipment are discussed in this article, particular attention is given to the economics of the manufacture of malt extract. Such a breakdown of the cost of plant equipment and of production activities is seldom available for publication. It contains information that is important to makers of***

Bakery products
Breakfast cereals
Flour Malt
Malt extracts

IN RECENT YEARS bakers have been requiring a higher diastatic power malt than was formerly demanded, in order to get the desired qualities into their bread.

Before the days of the harvester-thresher combine method of reaping the wheat from which bread flour is made, the diastatic activity of the flour made the use of high diastatic malt unnecessary. This was because wheat left in shocks, stocks or piles was subject to weathering which caused an increase in diastatic enzyme content of the ripened grain. Malt extracts having a 60 deg. Lintner strength were most generally used. Now malt extracts having a standardized diastatic power of 120 are most important.

Like all commercial malt extracts, this 120 diastatic power extract is of a syrupy character and has a specific gravity of about 1.4 (43 deg. Baume). Through the addition of concentrated cold water extracts of diastatic malts, the diastatic strength of these extracts may be standardized at any level between 120 and 500 deg. Lintner.

In the making of these high diastatic malt extracts the use of only 100 per cent barley malt is preferred. The diastatic strength of the malt itself varies. Its color is that of the pale brewer grade. By means of selective processing and accurate temperature control during extraction and concentration, the diastatic power of the finished malt may be held fairly constant at 120 deg. Lintner. But cost of production encourages the making of the lower powered extract and bringing up to standardized strength by the addition of the cold water extraction concentrates.

Malt extracts with a standardized diastatic strength have wide and varied industrial uses. Their use in the baking industry undoubtedly is their most important application in food manufacture. As previously stated the greatest demand is for 120 deg. Lintner extract.

In the baking industry the use of diastatic malt extract has a tangible threefold purpose. Up to 45 per cent of the sugar generally used in bread making may be reduced by the use of malt extract. Shorter fermentation time (12½ per cent), and approximately 7.5 per cent greater loaf volumes are obtainable. Better crumb texture and crust color also result because of its use. These benefits result because of the sugar, the diastatic enzymes, and the proteolytic enzyme content of the extract. Flavor, mineral salt content, vitamin and highly digestible protein content may be listed among the intangible benefits obtained through the use of malt extract in bread making.

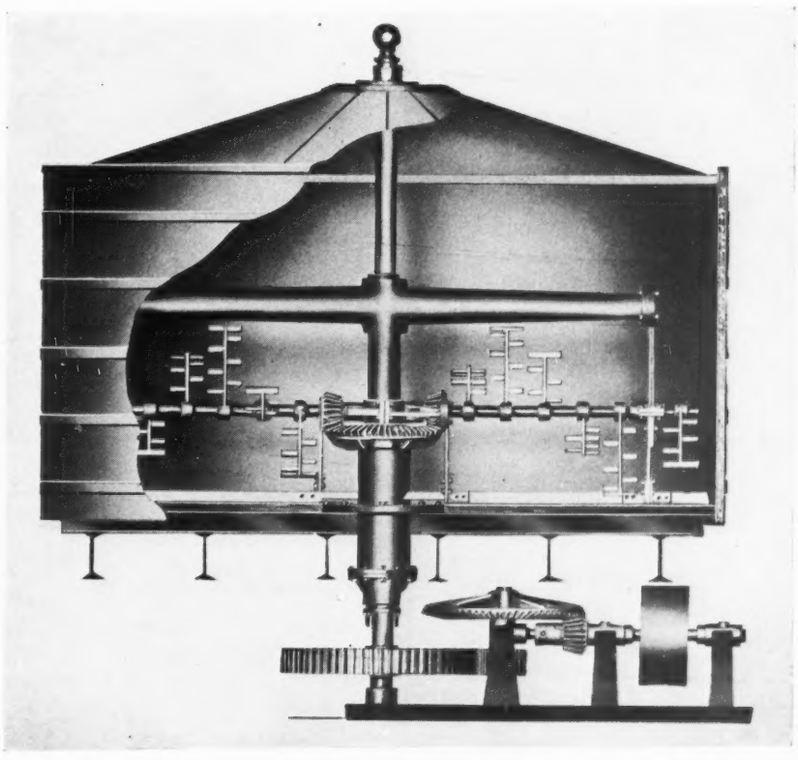


Fig. 2—Mash tub equipped with hydraulic lift mash machine. (F. Aue Co.)

In the course of making this new type of malt extract, the malt is first cleaned of all foreign materials by means of a cleaning reel (Fig. 1) equipped with magnets which remove all bits of tramp iron and steel. The cleaned malt is crushed between corrugated rolls in a malt mill to a fineness depending upon whether a conventional mash tub or a mash filter is used.

Unless the malt is correctly ground or if any unbroken grains are present, the extract yield will be lowered. If the malt is ground too finely, speedy filtration of the wort will be impossible and a large percentage of extractables may be thrown out with the "residual spent grains." For these reasons selection of the right type of malt mill is important. The corrugations in the face of the mill rolls must be of the correct width and depth.

When a conventional mash tub is used the ground malt should compare closely to the following analysis made by sieves standardized for the classifying of malt grists.

Per Cent	
43.4 husks	
27.4 coarse grist	(a)
8.2 coarse grist	(b)
8.3 fine grist	(a)
8.5 fine grist	(b)
2.6 flour grist	(a)
1.6 flour grist	(b)
100.0	

When a mash filter is used in place of the conventional mash tub, the flour grist will have to be present in higher per cent than that given in the analysis classification. The husks in this case are not needed as a filtering medium.

After the malt has been ground it is mashed in with enough water at about 140 to 145 deg. F. to give the mass a consistency of thin porridge. The temperature and hardness of the mash water are highly important. The temperature range given is that of maximum enzymic activity. Care must be taken to avoid raising the temperature of the mash above 155 deg. F. Similarily the temperature of the sparge water should fall within the same range.

The mashed-in malt is held in the mash tub about 115 to 130 minutes to assure a complete conversion of the starches in the malt grains into maltose and dextrins. The nitrogenous constituents of the malt are also modified during this mash tub stage of processing.

After an iodine test is made to determine the completeness of the conversion, the liquid or wort is drained into the drop tub. The malt residues are then sparged and the sparge water also drains into the drop tub. This wort should have a gravity of about 13 deg. Balling. After a suitable period of settling, the wort is pumped from the drop tub into the evaporator where concentration of the wort is carried out in one or more cycles.

The resultant thick syrupy concentrate is then run off into a blending vat equipped with a propeller type agitator where the additions of the several selected enzyme concentrates are introduced to give the desired standardized enzyme potency. This blending is carried out at 125 deg. F. and with continuous agitation. From the blender, the extract is packed into commercial packages which are primarily 5-gal. metal cans and 30-gal. wooden barrels.

In the manufacture of malt extract the mash tub is unquestionably the most important piece of equipment. It must be adequate in size and must be equipped with the right types of mashing rakes, sparging heads, spent grain remover and false bottom. Fig. 2 illustrates one of satisfactory design. In determining the size of the mash tub, its volumetric capacity should closely correspond to the ratio of 1 cu.ft. of volume for each 8 lb. of ground malt plus additional volume needed to contain the 2/7 cu.ft. of mash water for each 8 lb. of malt. (*Brewery Age*, December 1936.)

Depth of the grains in the mash tub when dry, should not exceed 24 in. The method of computation may be illustrated in the production of 500 gal. of diastatic malt per eight hour day. The weight of 1 gal. of 80 per cent total solids malt extract is: 8.3 lb. per gal. water × 1.41 sp.gr. of malt = 11.74 lb. per gal. of malt extract. 500 gal. malt extract per day is equivalent to 5,870 lb. per day. On the basis that 1 bu. of malt will normally yield 25 lb. of extract solids, the quantity of malt required to produce 5,870 lb. of malt extract containing 80 per cent solids is 188 bu. Allowing 1¼ cu.ft. for each bushel, the volume occupied by this

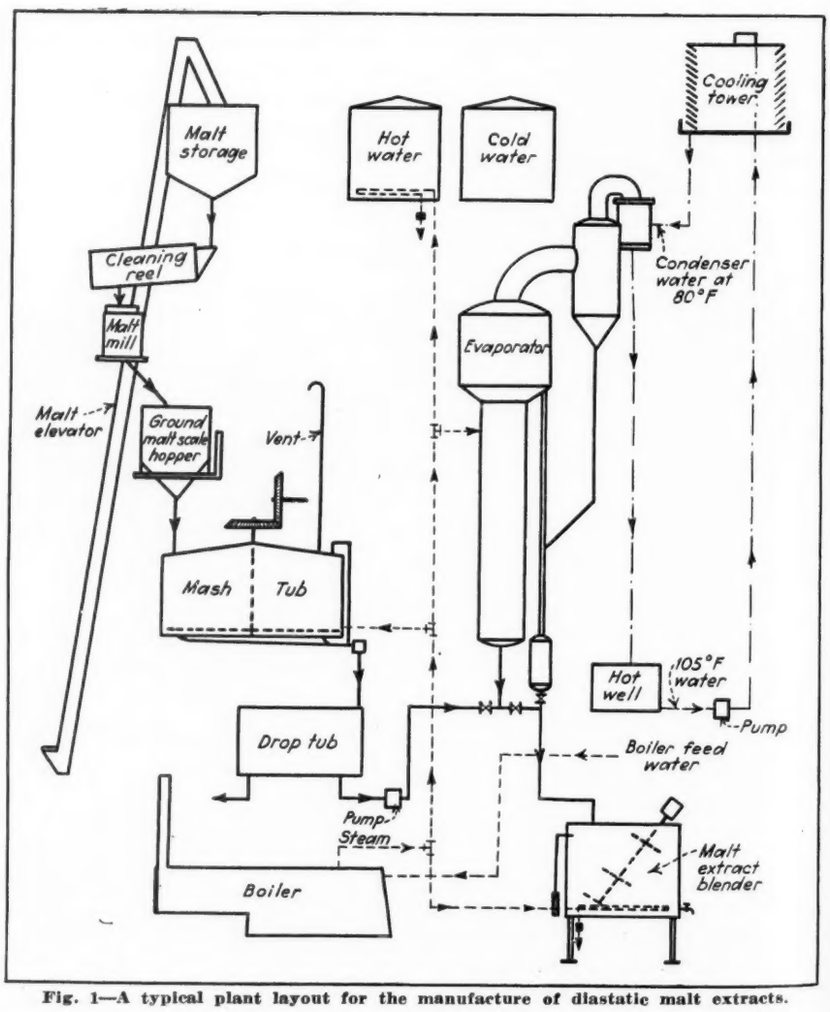


Fig. 1—A typical plant layout for the manufacture of diastatic malt extracts.

Cost of Malt Extract Plant Equipment

Item	*Without Cooling Tower*	*With Cooling Tower*
Cooling tower	.....	$6,000.00
Cleaning reel	$475.00	475.00
Malt mill and motor	800.00	800.00
Auto scale and ground malt storage	1,100.00	1,100.00
Mash tub	4,800.00	4,800.00
Evaporator unit	8,400.00	8,400.00
Boiler and auxiliaries	1,200.00	1,200.00
Tanks and agitators	1,400.00	1,400.00
(A) Sub totals	$18,175.00	$24,175.00
Labor installation	1,500.00	1,500.00
Water piping systems	800.00	900.00
Steam piping systems	300.00	300.00
Electric system	1,000.00	1,000.00
(B) Sub totals	$21,775.00	$27,875.00
Engineering plans and supervision of erection	2,100.00	2,600.00
Total cost of erected plant	$23,875.00	$30,475.00

quantity of malt is 235 cu.ft. To limit the depth of the malt in the mash tub to 2 ft., the area of the mash tub should be 117.5 sq.ft. which is had if the diameter of the tub is 12¼ ft.

Better wort drainage is obtained, however, if the depth of the malt in the tub is limited to a depth of 20 in. and the tub has an area of 128 sq.ft. or a diameter of approximately 13 ft. Since the height of the tub is one-half its diameter the 13-ft. diameter provides sufficient tub capacity to prevent an overflow during the mashing in operation.

The water ratio required for mashing is 35 bbl. of water per 100 bu. of malt and for sparging 40 bbl. of water per 100 bu. of malt; a total of 75 bbl. of water per 100 bu. of malt.

Concentration of the 13 deg. Balling wort to an 80 per cent total solids extract requires removal of 83¾ lb. of water for each 100 lb. of wort. Only 16¼ lb. of finish extract results.

The water may be removed in various ways. But the enzymes of the extract must be preserved, as enzymic activity is necessary in the finished product. This proviso means that the concentration must be done at a temperature not to exceed 140 deg. F. In practice a margin of safety must be provided for. For such reason the evaporator must be designed to operate at a continuous vacuum of 26 in., which is equivalent to an absolute pressure of 1.94 lb. or, expressed in round figures, approximately 2 lb. Reference to recognized standard steam tables shows that 2 lb. absolute pressure corresponds to a boiling temperature of 126.15 deg. F.

Obtaining a malt extract uniform in density and enzymic activity requires that the 26 in. vacuum (126.15 deg. F. boiling point) be maintained constantly and that the temperature of the steam in the steam jacket should not exceed 165 deg. F.

Best practice in the operation of an evaporator is to run as a single effect to evaporate 13 deg. Balling wort to 50 per cent total solids in a five-hour period and then concentrate the effluent from the previous stage from 50 to 800 per cent total solids in a three-hour period.

Since the production of 500 gal. of diastatic malt in an eight-hour day is dependent upon the size of the evaporator, the amount of steam supplied, and the volume of condenser water available, it is well to know how much water has to be evaporated. As previously stated, 83¾ lb. of water has to be evaporated from 100 lb. of 13 deg. Balling wort to get 16¼ lb. of finished extract, which weighs 11.74 lb. per gal.; a total of 5,870 lb. for 500 gal.

5,870 lb. ÷ 16¼ lb. × 83¾ = 30,254 lb. water to be removed from a total of 36,124 lb. of 13 deg. Balling wort each eight-hour day.

For the removal of this water, both high and low pressure steam are needed. Low pressure steam is used in the steam jacket chamber to evaporate the incoming wort. High pressure steam aids in the concentration from 50 to 80 per cent total solids extract.

It is well recognized that steam economy increases in multiple-effect evaporation as also does the first cost of the equipment. When more than a single effect evaporation is being considered it is necessary to select an evaporator which will give a balance between steam economy and the expense of interest, depreciation and maintenance. On the basis of actual operation, a single effect evaporator has been found to be the most practical unit to use in the making of diastatic malt extract. A usual combination to use would likely be multiple-effect evaporation from the wort feed to a semi-finished extract and then single-effect evaporation to finish the extract to the desired density.

Under such a procedure the greater quantity of water is evaporated under conditons of maximum steam economy while the remaining water is evaporated under conditions that give maximum speed of evaporation of the viscous materials.

Under such a set-up, 5,500 lb. of steam per hour at 0 lb. gage is needed in the first (five hour) cycle of making 500 gal. of finished malt extract in an eight-hour day. In the (three hour) cycle, 1,300 lb. of steam per hour at 0 lb. gage and 200 lb. of steam per hour at 100 lb. gage is needed. The total steam demand is 32,000 lb. in the eight-hours; equivalent to 1,066 boiler horsepower. At an average cost of 30 cents per 1,000 lb. the steam cost is $960 for the eight-hour day.

The amount of water needed for the evaporator condenser is quite an item of expense. Where 75 deg. F. inlet water is available, 375 gal. per min. or 157,500 gal. per seven-hour operation of the condenser, is needed. At 60 cents per 1,000 gal., the cost of condenser water is $94.50 per seven-hour day. When water costs are so excessive, it is advisable to install a cooling tower. This conclusion was reached on a specific installation after a survey was made of all costs involved. The survey showed that, by recirculating the condenser water through a cooling tower which would cool the outlet water at 105 deg. F. to an inlet water temperature of 80 deg. F., the water would have to be recirculated at the rate of 450 gal. per minute.

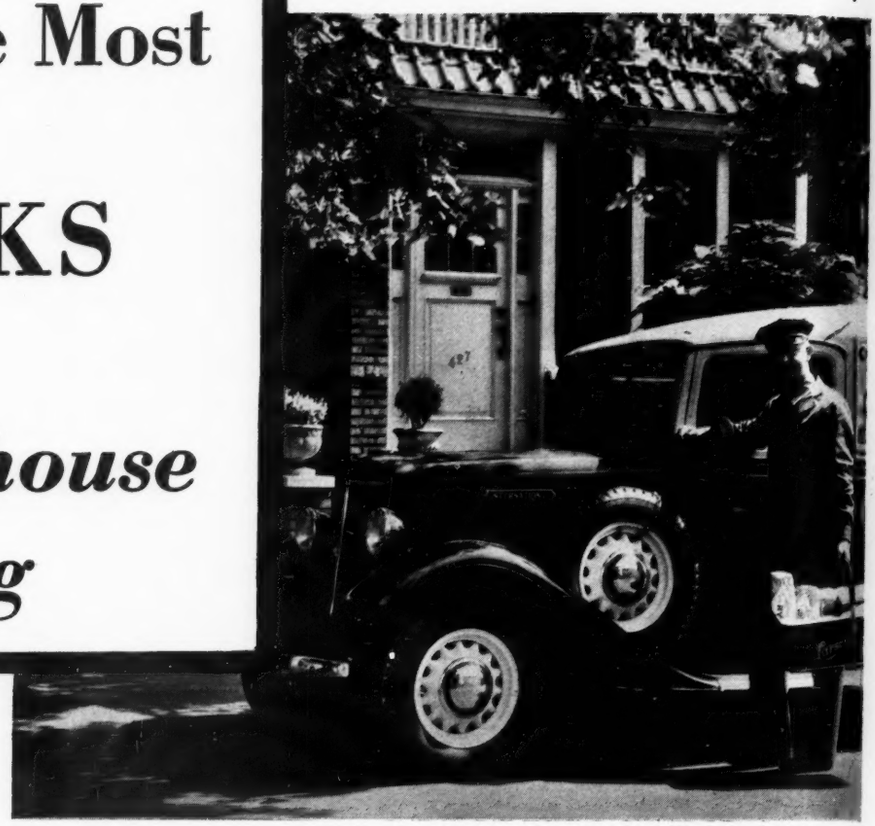
Taking into account (*a*) the pumping costs of recirculating the water, (*b*) the cost of make-up water, (*c*) depreciation, and (*d*) interest on the capital invested for the cooling tower installation, the total daily cost amounted to $5.37. The breakdown of this cost is:

Electric power to pump 450 gal. of water per minute against a 50 ft. head is 6.7 kw. x 1¾ cents x 7 hours	=	$0.84
Daily interest on $6,000 investment at 6 per cent	=	.99
Daily depreciation on $6,000 investment at 10 per cent	=	1.65
Cost of 2 per cent make-up water at 60 cents per 1,000 gal.	=	1.89
Total cost of recirculating water		$5.37

A summary of the costs of making 500 gal. (5,870 lb.) of 120 diastatic power malt extract per eight-hour

(*Turn to page 286*)

Making the Most of TRUCKS in *House-to-house Selling*



One of the latest International route trucks put into service by Larsen Baking Co., showing layout, special poster and the routeman with his uniform and

IMPORTANT IS THE PART PLAYED in successful house-to-house merchandising by the vehicle used to carry the products. In the food industries, the house-to-house sale of milk is perhaps greater in volume than that of any other product. But door-to-door selling of bakery goods has increased materially in the last decade. Fruits, vegetables and fish are other general classes of foods sold to a lesser extent on the house-to-house plan in suburban or rural communities. In some sections of the country, canned goods and groceries also are distributed in this way.

In each food industry, automotive equipment is used to some extent. Years ago, horse wagons were employed exclusively. But with the advent of motor vehicles, the pioneers in the various industries introduced trucks into their delivery fleets, this with varying degrees of success.

The desire to expand and increase the sales volume gave trucks their first big impetus. The delivery radius of the horsewagon was limited to 5 miles and the total daily mileage to 15 or 20 miles, at the most. So motor vehicles had to be used for the territory beyond that radius.

As the demand for more and more volume continued, the limits of the motor vehicle were reached. A truck could go only so far from a pasteurizing plant, bakery or other central point of production and return within the time limits of the working day. This led to the introduction of the substation in the scheme of distribution. Large-capacity motor vehicles were used to transfer the goods from the main processing or producing plants to outlying stations. The stations in turn served as bases for the house-to-house trucks. Thus, the total sales area was again increased, roughly by the distance between the central plants and the outlying stations.

There was no question about the use of motor trucks for the transfer work because of their ability to move heavier loads faster than the horse wagons. Similarly, there was no question about the use of lighter trucks on routes over 15 to 20 miles in length.

But there were, and still are, many questions as to the relative merits and costs of horse wagons and motor vehicles for use within the 5-mile delivery radius, both of the main plants and the substations. Any type of truck used in this restricted delivery area costs roughly twice as much to buy and operate as one one-horse wagon. So the truck must do twice as much as the wagon if its unit delivery cost is to be as low.

Many large milk and bread distributors using both wagons and trucks in the restricted delivery area insist that the horse wagon gives the lower unit delivery cost. But many automotive experts maintain that this is only because the motor vehicle is not properly applied. They point out several examples of where trucks, considered impractical for many years, are now used exclusively. For instance, there is the collection of garbage and paper by New York City's Department of Sanitation. Years ago, the D.S. executives insisted that the one-horse cart and driver gave the lowest pick-up cost. Now, speedy pneumatic-tired trucks of twenty times the carrying capacity, of seven times the speed and with crews of half a dozen or

more loaders do the work more economically than ever before.

Or consider the Philadelphia magazine publisher who had had his rolls of paper delivered by three-horse teams for 30 years. This publisher insisted that, because of the short hauls, trucks could never do the work for less money. But they did. A demountable body did the trick. This was lifted off the truck at the plant by a chain hoist and was unloaded while the truck was going for its next load.

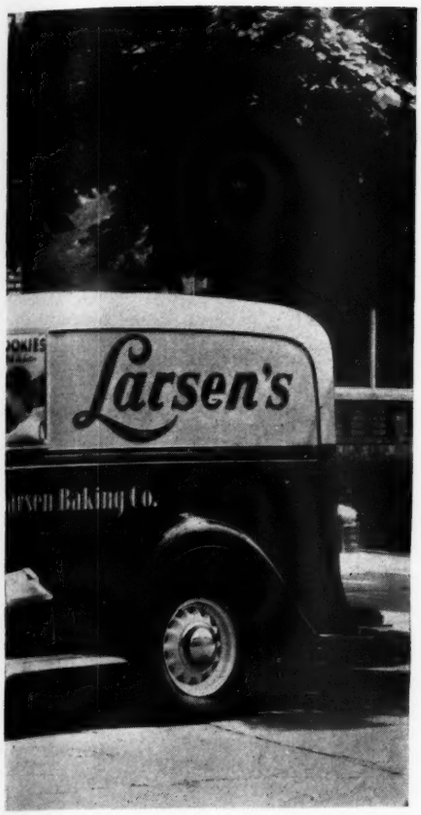
Many similar examples might be cited from the writer's experience in automotive-fleet operation. These two are mentioned here simply to justify the contention that if trucks, as used in present-day house-to-house distribution of milk and bakery goods, cost more than horse wagons, it is because they either are not the proper type of vehicle or they are not properly installed.

Of especial interest to the readers of FOOD INDUSTRIES is the case of Larsen Baking Co., Brooklyn, N. Y. This concern has been selling house-to-house for 37 years. The products so distributed include bread, rolls, cakes, pies and pastry.

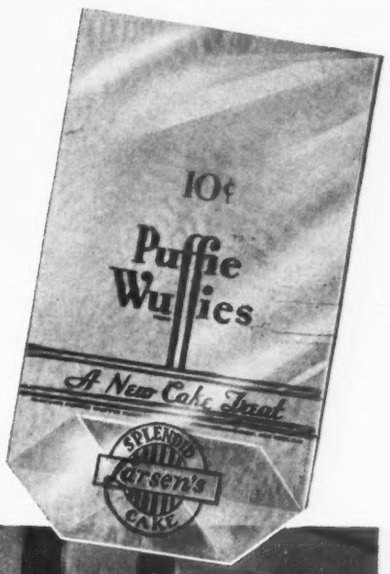
Since Larsen started to motorize its delivery equipment in 1934, it has increased its sales volume per year from $1,000,000 to $1,300,000. This was accomplished principally by an increase in sales territory made possible by the use of motor trucks. The company now has 128 trucks and 45 one-horse wagons. It has purchased 65 trucks in the last two years and plans to be entirely motorized next month.

The company's main plant, where all its goods are baked, is in Brooklyn. One distributing branch is in Jamaica, L. I., less than 10 miles away. Another is in Staten Island, this being reached by ferry from downtown New York. A third branch is in Hoboken, N. J., across the Hudson River from New York. This is reached by ferry or by vehicular tunnel.

(*Turn to page 286*)



showing the type of body, lettering open display basket.



Larsen Baking Co. uses a tie-up between the product and the automotive equipment. The seal on the bag shown here is the same as that on the company letterheads and on the cab door of the tractor shown below.

First of Larsen's tractor and semi-trailer outfits purchased to reduce the cost of transferring fresh-baked goods from the Brooklyn plant to three nearby distributing stations. This unit also hauls incoming supplies of flour, raisins, filling and other materials. The Stewart tractor and the Fruehauf trailer carry a load of 8,000 lb. Their color scheme is cream and medium chrome green. The cab door seal and the trailer lettering tie up with the labels on the wrappings of the company's products.

Reducing Time Out For Repairs

What food-fleet operators do about it

IT IS NECESSARY TO TAKE TIME OUT in the operation of a truck to repair the vehicle. But this time out can be of two kinds—scheduled and unexpected. Being planned, the former does not interfere with distribution. But the latter, which may result either from mechanical breakdown or from an accident, is more unfortunate and costly. It usually occurs on the road, frequently when the truck is loaded.

Unexpected time out resulting from mechanical failure can be practically eliminated, and that from accidents can be reduced to a very small factor. For that matter, even scheduled time out can be curtailed.

Various steps which may be taken to accomplish these reductions in time out are discussed below by fleet operators.

Trades Off Old Trucks

Booth Fisheries Corp. owns and operates a fleet of approximately 100 trucks. However, these trucks are scattered among some 26 branches throughout the United States and Canada. The number of trucks at each branch varies from one to sixteen. Generally speaking, the control of time-out of service on trucks is largely a matter of upkeep. Our general policy is to trade in trucks at the end of three years, as we have found that after that time the repair cost mounts quickly and trucks are subject to frequent breakdowns. Where a definite trade-in policy of three years is followed, the amount of time out of service is negligible.

The trucks are gone over carefully each week, a check-up being made of all parts. Worn parts are immediately replaced, and the trucks are kept in top-notch shape. With such a procedure we have very little loss of time.

We carry just sufficient trucks to cover the necessary work of the particular branch. We do not have extra trucks which lie idle. Should it be necessary, due to the pressure of work, we find it quite easy to secure additional trucks on a rental basis by the day.

Perhaps the greatest cause of time-out can be laid to accidents on the road which necessitate major repairs, and we have attempted to cover this by laying great stress on safe driving. We check our drivers closely as to accidents, even of the most minor character. Any indication of continued carelessness on the part of the driver is cause for dismissal.

Inasmuch as our fleet of trucks is scattered among many branches with but few units at each branch, our problem of control is probably not as great as where there is a large number of trucks at one place. We look to our branch manager to control the operation of the trucks under his jurisdiction, and our traveling auditors continually check the cost of operation and performance of all trucks.—IVOR WAGNER, *Vice-President and Treasurer, Booth Fisheries Corp., Chicago, Ill.*

Keeps Trucks in Good Repair

We believe that our trucks should always be in good repair. A report is turned in daily, by our drivers, containing remarks about their trucks. These reports are then checked, and our mechanical force makes the necessary repairs as our trucks return to the garage.

Our garage force uses mornings for overhauling work, while afternoons, when trucks return, are used for a general checkup of equipment.

We are able to make progress in painting by having two spare trucks on hand, thus allowing two trucks to be painted all the time. We also have two spare trucks to take care of road failures and time out mechanical repairs.

We have no record of how long trucks are in the workshop. Time out in the work shop is only extended when repair parts cannot be readily purchased.—J. J. Vaughan, *Frisbie Pie Co., Bridgeport, Conn.*

Have You a Question?

Many problems and practices pertaining to truck operations have been discussed in this department of FOOD INDUSTRIES by a hundred or more executives during the past several months. But perhaps you have in mind some particular question which has not been covered and which you would like to see discussed in these pages by other fleet operators. If you have, don't be bashful. Tell us about it, in the next mail.

—THE EDITOR.

New Opportunity for Management

ORDINARILY THIS PAGE is devoted to technical matters of greatest concern to foremen, superintendents, and plant management; but this month it is devoted largely to industrial relationships. And this is a problem that goes clear up to the president of a company.

Three Different View Points

Workers in any industry, according to a classification worked out by Whiting Williams, who is a specialist in this field, are of three types of which the "Sixty-Per-Center" is the most important. He divides them up this way:

Twenty per cent of the workers are the youngest men, adventurous, enthusiastic, easily led, and always ready for excitement;

Sixty per cent of the workers are average men with homes and responsibilities;

Twenty per cent of the workers are the oldest men. They are decidedly pro-company and are usually in line for company pensions in a short time if a pension system is in effect.

The youngest group—the 20-per-centers, according to this classification, —are pro-union if there is one in sight. They are the daring, excitement-loving youths of the industrial family. They have not been long exposed to the discipline of life. If they are subjected to conservative influences they sober down in a few years and become 60-per-centers. In them the spirit of adventure is strongest.

The oldest group of 20-per-centers are the old men of the industrial family. They are affectionately called "Dad" or "Uncle" by the youngsters, who privately admit that the oldsters are a bunch of "fogies" who missed the boat about 30 years ago. And probably their greatest objective in life is security. They will put up with anything as long as it holds their jobs. Hence they do not represent the views of the majority.

More important than all else is the 60-per-center, for he is 100 per cent pro-job. In this group is the back bone of the organization—the really successful men of the plant—the men who not only are in the majority but the very group which forms the central body of opinion in any plant.

In the 60-per-centers are nearly all the skilled employees. And there is no doubt about this: unskilled employees respect the skilled ones. Men in the skilled group have about four times as much influence with their fellow workers as the unskilled men. They are success stories personified.

It is this group of men that deserve far more attention by employers than they have had in the past. Their opinions as to what is needed in the plant are often the soundest. Management can do much for the good of the business by conferring more often with them.

In a sense the so-called labor leader is the active competitor of management for the favorable attention of the 60-per-center. Management has a tremendous advantage over the leader if it will recognize it and use it.

No Substitute for Human Contacts

There is no substitute for ordinary human contacts and genuinely friendly relations with men. If management is too busy, too isolated from the men who may be facing problems of their own while outsiders are lending a sympathetic ear, the fault lies with management.

A corrective procedure that has been suggested by Mr. Williams is for management to make a tour of one department every morning for an hour before going to the office. This tour would, of course, be in company with the foreman of the department. Its purpose would be to get personally acquainted with the folks in the humbler jobs, to find out: How the work is going; are the workers as comfortable as they should be; are tables too high or too low; is there enough light; do they have proper locker accommodations; is the equipment running right; are their feet dry; are supplies coming along properly; and similar commonplace matters that cannot always be discovered by a walk through a department.

Men and women cannot resist responding to a genuine, kindly interest in their welfare, particularly when their recommendations are put into effect. They enjoy a chat with the folks higher up even though it is sometimes a breath-taking experience for some of the more timid souls.

Foremen are Most Important

No more important part in good employee relations is played by anyone in a plant than by the foreman. In large plants, often the only contact an employee has with higherups is with his own foreman. To all intents and purposes *the foreman is the company.* He represents, in the worker's eye, the attitude of the management.

If the foreman is reasonable, intelligent, thoughtful, the worker unconsciously forms an opinion that the company is directed by the same type of men. On the other hand, if the foreman is sour, unreasonable, abusive, impossible to please, it is inevitable that the workers will unconsciously gain a fixed idea that the management is a bunch of first class so-and-sos.

Hence it is important that the foreman must personify all that management wants the workers to believe that it is. An unreasonable foreman can undo all the good that management may attempt to accomplish. But we must not forget that an unreasonable superintendent will develop unreasonable foremen. Hence the problem of creating good family relationships extends from top to bottom.

Management today is in competition with the C.I.O., or other outside agencies, for the leadership of the rank and file of the plant personnel. And it would seem as if something were seriously wrong when employees will pay their own good money to outsiders to hire the leadership outside that should be theirs for the asking, right in the company. If management does a good job and sells itself to the workers, it can take away all the customers of the outside organizer.

Opportunity is still here. Grasp it while it remains.

Lest You Forgot

Maintenance and repair work must be carried out promptly, and had best be done before any actual breakdown occurs. Otherwise time and money will be lost through unscheduled shut-downs. "Systematic Plant Maintenance," FOOD INDUSTRIES, January, 1935, page 8, tells how the use of a "plant maintenance manual" will help to avoid plant shut-down losses.

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Bearing Trouble

Many things can cause trouble with bearings making them heat up seemingly without cause. One of these is a bearing that is too light for the load imposed upon it. There are various kinds of loads that must be considered in any diagnosis of bearing trouble. Some are simply heavy radial loads. Others are shock or intermittent loads which pound at the bearing, and still others are thrust loads, in which the shaft thrusts endwise in its bearing mounting.

Just as these various conditions may exist in plant machinery, there are various cures which may be applied. Quite often a bearing which gives a great deal of trouble can be robbed of its trouble-making qualities through the most suitable method of lubrication, whatever that may happen to be. Lubrication engineers can very quickly get to the bottom of any problem that can be solved in this way, and overcome the difficulty.

On the other hand, there are cases in which plain babbitted bearings are operating and giving trouble, where the substitution of an anti-friction bearing of either the ball or roller type may plainly be indicated. Again, a thrust bearing may be needed in order to make a machine function properly and bring trouble to an end. Every case should be very carefully considered before making such change-overs, however, in order to be sure the most economical thing is being done.

There have been and are many cases in which a sprung shaft is the cause of a bearing heating unduly. A shaft may be sprung as a result of being bumped by a truck or other heavy object. On the other hand, cases have been known in which a shaft that had been turned perfectly true in the lathe, sprung when a keyway was cut in it afterward. This is due to the release of interior balanced stresses in the shaft by the cutting of the keyway. Any shaft with a full-length keyway is open to suspicion, especially if trouble develops at any of its bearings.

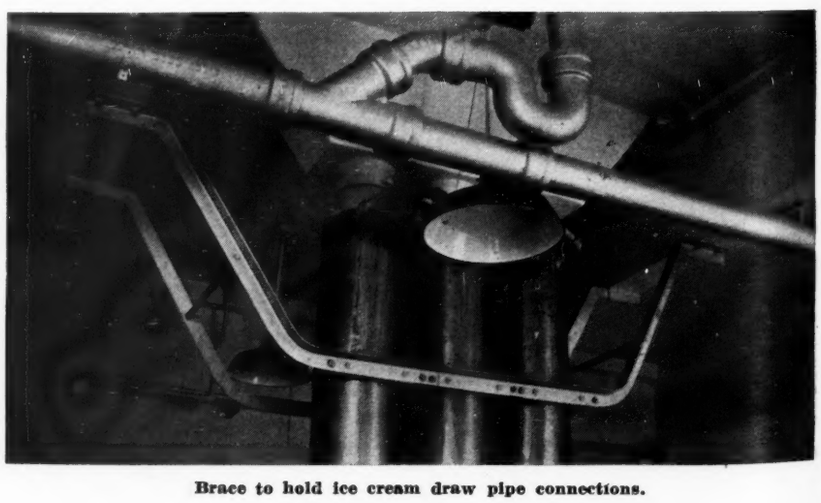
Yet another cause of bearing trouble is the maintenance of proper bearing clearance. The collar which holds the shaft in proper longitudinal position by running against the end of the bearing, wears and allows a bumping of the collar against the end of the bearing if a thrust occurs for any reason. It is very hard to reset such a collar for proper bearing clearance, because just a hair's breadth makes all the difference. If set too closely, friction will generate heat, the heat will expand the metal in the bearing and in the collar, causing still more friction and more heat, and the trouble builds up progressively. Perhaps the best solution to this type of trouble is the use of a compensating device which consists of two helical cam-faced members, which can be adjusted to fill a given space, and which tend to expand because of contained springs, and which therefore operate automatically to take up wear as it occurs.—JOHN E. HYLER, *Peoria, Ill.*

Draw Pipe Maintenance Reduced

Opening and closing the draw valves in ice cream draw pipe connections results in excessive maintenance and the inconvenience of taking the draw pipes down for repairs. The trouble ceased when a secure brace, as shown in the accompanying photograph, was installed to prevent breakage.

This brace consisted of a framework made of 2x2x½-in. angle iron. Two lengths of this iron were bent as shown in the photograph. To make the feet, the web of the angle was mitered, bent, and then welded. Spacing bars were welded in place as shown. The framework was bolted to the ceiling I-beams.

Each pipe was held in its respective position with a steel strap having two studs passing through the angle iron and held by nuts. To prevent cramping, a curved shoe of hard wood was placed between each pipe and the angle iron. The picture shows only the upper section of the draw pipe connections.—JIM BRADFORD, *St. Louis, Mo.*



Brace to hold ice cream draw pipe connections.

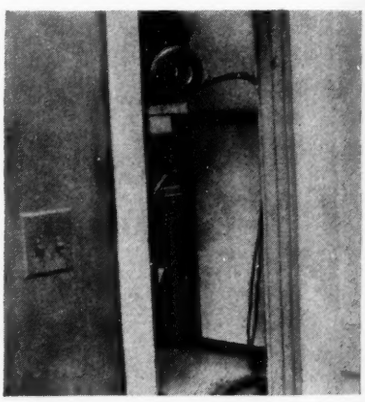
An Extra Eye and Voice

Much time is often lost in plants where men, working in separate rooms, must coordinate their efforts. In our plant, we got around one of these difficult situations by the use of a mirror and a bell.

Reference to the photograph will show the mirror set on the other side of an open doorway. The picture was snapped from the receiving operator's position in front of the weighing vat and scale.

By looking into the mirror the operator can see the pipe changes from one pasteurizer to another. This tells him when to release the milk flow, after weighing.

The bell above the mirror serves to give signals that can be heard. The workers' voices would be lost in the noise of the can steamers and the sizzling of the pasteurizers.—AL SUTTON, *Kansas City, Mo.*



Mirror and bell provide an extra eye and voice to aid in coordinating dairy plant operations.

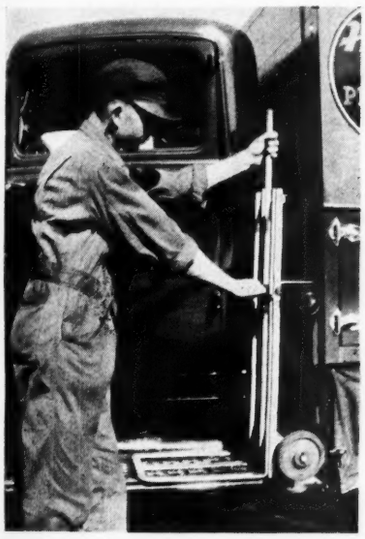
Hand Truck Carried on Running Board

A hand truck that is not only quiet in operation, but also does not scratch the plant floors, can easily be constructed in the plant shop. The example shown in the photograph was constructed for handling milk bottle cases.

The truck has a back made of three wooden bars, the center bar being extended to serve as a handle. The foot is made of soft steel strips, 5/16x1 in. These strips are bent and extend along the face of the wooden bars to which they are screwed. The two outer strips are bent and welded to form the toe.

A three piece axle assembly is bolted to the bars. The axle is made of ¾ in. diameter cold rolled steel. It is carried in a bridge of ¼x4 in. steel, with 11 in. between sides. Wheels are of solid rubber, 6 in. in diameter.

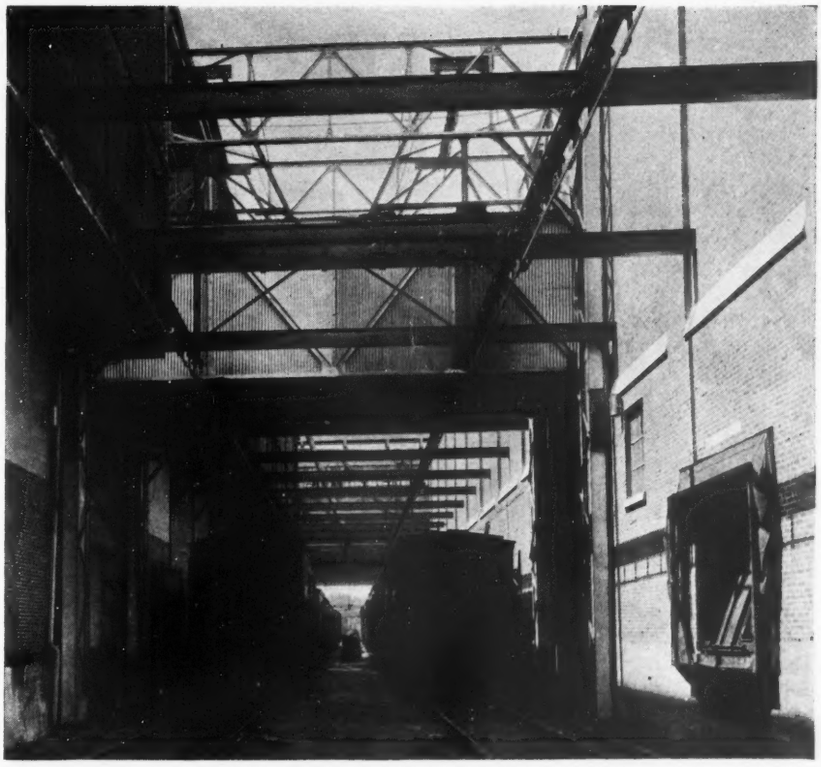
The arrangement for carrying this hand truck on a delivery truck is shown in the photograph. A catch is attached to the front end of the truck body. It is of ¼x4 in. soft steel, offset 5 in., with side fingers attached by welding. A ⅜ in. cold rolled steel stud, shaped like a Roman T, engages two of the back bars resting against the side fingers. It has a coil spring, washer and nuts to hold a tension in a latched position. To release, the T stud is pulled out and turned to a vertical position. The hand truck can then be removed from the running board.—CARL RICHARDS, *Chicago, Ill.*



Hand truck for milk cases carried on running board of delivery truck.

Trucking Bridge Lifts

How to get factory trucks and other plant traffic from one building to another when railroad tracks lie between is a problem that has been solved at the plant of the Geo. A. Hormel Co., Austin, Minn.



This traffic bridge, raised to permit freight cars to pass beneath, when lowered forms a covered passageway for traffic between buildings

Reference to the picture will show how this was done. The bridge between the buildings is shown in raised position, so that cars can pass under it on the tracks. When no freight cars are in the way, the bridge is lowered into position. Traffic can then pass back and forth, under cover, between the buildings.

As can be seen in the photo, the bridge rides up and down in a structural steel framework. The bridge itself is made of structural steel, with a corrugated, galvanized sheet covering. Motive power is supplied through steel cables operated by a 3-ton P. & H. hoist, base mounted inside the building at the left. This hoist is operated by push-button controls, permitting the bridge to be raised or lowered at a moment's notice.—*Source of information,* THE HARNISCHFEGER CORP., *Milwaukee, Wis.*

Boiler Water Test

Knowing the chloride content of the water used in the power plant is handy in so many ways and the method of determination is so simple that no one who has any responsibility for the operation of any power plant can afford not to make use of it. While the chloride test has many uses which will readily occur to the engineer once he starts using it, I will mention four of the most general uses that are common to all power plants.

When raw cold water is fed to the boiler it is heated and then as steam is generated it leaves behind it the solvents which become concentrated. Most of the other constituents of the water precipitate either partially or wholly as the temperature and concentration increases, but the chlorides remain in solution because they are soluble at very high temperatures and concentrations. Starting with fresh water in the boiler, the chloride content of the boiler water is the same as that of the feed water, but after the boiler has evaporated a quantity of steam equal to the amount of water it holds, the boiler chlorides will be double the feed water chlorides. When another such amount of steam has been generated, the chlorides in the boiler will triple, and so on. Thus, with the chloride test it is possible to determine the concentration of the boiler water because a relation exists between the total concentration and the chloride concentration. By multiplying the chloride content by a factor the total concentration is obtained.

In the food industry a lot of the

The Plant NOTEBOOK

steam is used for process and it should be clean. If the concentration of the boiler water is high, the boiler will foam and prime and the steam will not be clean. In blowing the boiler, in order to keep the concentration down, the chloride test is being used as a guide. If the boiler is blown without any standard it will either be blown too much, which is a waste in fuel; or it will not be blown enough, which will result in dirty steam. Determine by test what is the highest chloride that you can have in your boiler without priming and foaming, and keep this concentration by methodical blowing.

The chloride test can be used to find out what concentration we should carry without priming. Take a sample of condensed steam from the trap and test it for chloride. If the steam is clean then the chloride indication will be only a trace but if the indication is strong there is serious priming and foaming. Blow down the boilers until the chloride of the condensed steam is reduced to a trace and then keep the concentration at this limit. Some boilers can operate without priming with a concentration of as high as 500 grains per gallon, others must be kept around 50 grains per gallon to prevent priming. The fault may not be with the boiler proper, for the nature of the water has a lot to do with it.

A third use for the chloride test is to check the condenser leakage. When you test the condensate for chloride, it should indicate the same as the sample taken from the steam trap or a trifle more. If it is appreciably higher that means that the condenser leaks.

Another use is to find out the amount of raw water. Suppose that the chloride of the raw water is ten grains per gallon and that of the water fed to the boiler nine grains per gallon. This means that 90 per cent of the feed water is raw and 10 per cent condensate. If calculations tell you that the condensate should be 20 per cent instead of 10 per cent, then start looking to find out

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where you are wasting either steam or condensate.

Chloride tests are simple to make, as follows: Take a 100 cc. sample of the water and add two drops of phenolphthalein indicator which will change color to pink if the water is alkaline. Add small quantities of twentieth normal sulphuric acid and stir between additions until pink color disappears. Add four drops of potassium chromate indicator and the color will become yellow. Add silver nitrate solution and stir until the yellow color changes to dark red. The amount of silver nitrate used will be proportional to the chlorides. If the water did not turn pink with the addition of the phenolphthalein, proceed with the potassium chromate indicator. In ordering the silver nitrate solution the strength should be specified so that each cc. of silver nitrate used should correspond to 1 gr. per gallon of sodium chloride. — N. T. Pep. *Chicago, Ill.*

Alley Can Express

In our plant we use what we call the "Alley Can Express." This takes empty cream cans from the ice cream side of our dairy plant to the receiving side. They are then cleaned and returned to shippers.

The truck used consists of a flat deck of 1 in. wood planks. This is covered with galvanized sheet iron. The edges of the deck are bound by attached strips of 1x1x⅛-in. angle iron. One leg of the angle projects upward, forming a lip to retain the cans. Fifteen cans are accommodated.

Wheels were obtained for this truck by using two large pneumatic tired wheels from a Model T Ford, and one small caster which acts as a support when the "Express" is at rest. The truck handle is made from ¾-in. pipe, flattened at the ends for bolting.

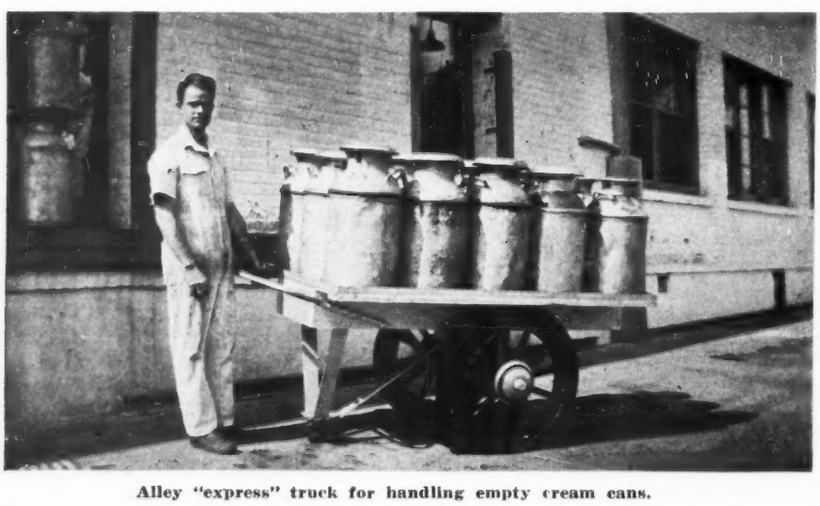
The advantage of this truck lies in its easy handling, even in the close quarters that exist in the alley.—George Kelley, *El Paso, Texas.*

Portable Bins

One of the most convenient methods of handling small packages from place to place in the plant is by means of portable bins. These may vary widely in size, depending upon the degree of portability desired and advantages in the individual case.

In some instances, where the packages are very small, little bins that can readily be carried by hand from place to place will be best. In others, the bins will be much larger, and fitted out skid fashion on the bottom to make for easy handling from point to point with lift trucks, or arranged with a hook to allow handling by crane or by monorail trolley. In other cases, it may be desirable to let them travel the conveyor between certain points.

In the production of certain goods of aging or perishable type, which run quite small in size, portable bins form the basis of an interesting system. By means of it insurance is provided that the material will be moved out for the filling of orders in the same order in which it was made or processed. The only thing to it is the consecutive numbering of all the bins used, and watching to see that the bins enter the production line in consecutive order. If, for instance, 200 bins are in use for a given product, they will all be painted, say, green on the outside to indicate that they are set apart for that use. They will be numbered from 1 to 200, will be used in consecutive order, and will be emptied in the same way. By the time number 200 is filled, a considerable number of the lower numbers starting from one will have been emptied, ready for repetition of the cycle.—John E. Hyler, *Peoria, Ill.*



Alley "express" truck for handling empty cream cans.

Can You Use $5.00?

Food Industries maintains this "Plant Notebook" section as a forum where readers can exchange with other readers information about successful methods and devices for doing the little, hard jobs that come up in every food manufacturing plant. If you read these pages, you will profit by learning how others overcome difficulties that you may face any day. If you use these pages to tell others about the methods and devices that have helped you, you profit because Food Industries pays $5 or more for each Plant Notebook contribution.

UNIFORMS

Who Should Supply Them?

USE OF UNIFORMS FOR EMPLOYEES is widely practiced throughout the food manufacturing industries because of their sanitary, safety, and morale building features. In fact, their use is becoming standard practice in all types of food plants.

However, these questions are still being asked: 1. Should the company or the worker pay for the uniform? 2. Should the company or the worker be responsible for the laundering? 3. Who should decide upon design of uniform and where or how often the uniform should be changed? 4. Should uniform regulations apply to men as well as to women workers?

Company Should Bear Uniform Expense

Pride, cleanliness, appearance, and good will are the chief factors that enter into the matter of uniforms for employees in plants engaged in food manufacturing.

To be progressive, the company should furnish all uniforms so as to get uniformity of dress and, if the cost of the uniforms is not regarded as part of the employee wage, to encourage good will. From the standpoint of fairness, the company should also pay the cost of laundering because: 1. The frequency of laundering varies per week according to type of operations performed by employee, 2. With a large amount of laundering, controls may be run on washings to determine laundry cost and durability of garment, and 3. If the laundry cost is not regarded as part of the wage, this service also builds good will.

The up-to-date company which buys the uniforms and pays for the laundering without any charge to the employee is then in a position to design the different types of uniforms needed; to set up standards and specifications for buying, and to dictate as to the number of times uniforms should be changed in the course of a week.

To have a well-dressed organization, the men and women engaged in production should be dressed in white. The men who handle raw materials or do shipping, maintenance, and engineering work should be dressed in light striped overalls. White is the symbol of cleanliness and shows soil very readily, and, what is more, if the employees are taught not to soil their uniforms and still do their work, the result will be a cleaner and better product, a neat-appearing organization, better discipline, and a regulation uniform throughout the plant.—SUPERINTENDENT — *Candy manufacturing plant in which the principles discussed here are practiced.*

Company and Employees Share Cost

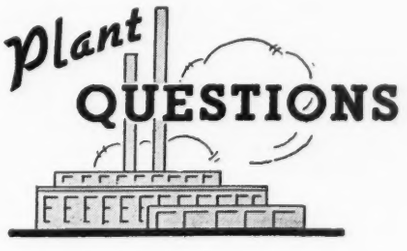
1. If the company insists on standard uniforms, the company and the employee should share the cost of the uniform. But the cost to the employee should be less than the price he would have to pay, if he bought through the usual retail channels. We buy uniforms for both men and women at wholesale prices and sell them to the employee at a discount of 15 to 33 per cent. As an illustration: girls caps cost us 15c. We sell them to to the girls at 10c. each. Girls' aprons which cost us $14.00 per dozen, we sell to the girls at 90c. each. The same proportionate scale applies to men's equipment.

2. We believe the worker should be responsible for the laundering of uniforms.

3. The design, style and color of uniforms should be decided by the company, but before adopting any pattern, the employees should be consulted. Care should be taken that the safety factor be considered. The use of uniforms is obligatory. Moreover, the highest standard of quality should be maintained both in the material and the workmanship. We have no set rule governing how often the uniforms should be changed other than that they must be clean at all times. For extremely dirty operations, we suggest that the worker wear a special bib apron to protect the uniform. The bib aprons are easy to wash and are low in cost.

4. Uniform regulation should apply to men as well as women workers.

Our girls wear white bungalow aprons of our own design, regardless of the work they do. The men wear unbleached cotton in the candy manufacturing departments and hickory striped in the chocolate, mechanical, warehouse, shipping and packing departments. All of the girls uniforms have short sleeves, as have the uniforms of all men who are employed near or in connection with machinery.—H. E. WHEELER, JR., *Henry Heide, Inc., New York, N. Y.*



More Next Month

Additional answers bringing out different methods of handling the problem of uniforms in food plants will appear in next month's issue.

New DISCOVERIES AND INVENTIONS

BAKERY PRODUCTS

Mold Inhibitors for Bread

BAKED GOODS such as bread, rolls, cakes and cookies are protected from mold growth by a superficial treatment with a small quantity of an aliphatic acid or a halogen derivative of such an acid. Acetic, propionic, butyric, valeric and caproic acids are useful for the purpose, and so are chloroacetic, dichloroacetic, trichloroacetic, bromoacetic and like halogenated derivatives of the aliphatic acids. The method of application is described in British Patent 455,846 (granted Jan. 21, 1937 to Standard Brands, Inc.) as a superficial treatment, whether by sponging, brushing or spraying. When acetic acid is used a suitable proportion is 1/70 of an ounce for each pound of bread or cake. Instead of the mechanical methods of applying the acid, the baked goods may be exposed to air saturated with the vapor of the acid. The treated goods keep free from mold much longer than do the same products without the treatment.

Standards for Flour

THE PRINCIPAL BASIS FOR GRADING wheat and rye flours, and for setting up quality standards, is according to whether the flour is made from the whole grain or without some part or all of the bran and gluten. The bran contains nearly all the ash of wheat or rye grains, and so ash content provides a criterion for estimating the percentage of whole grain used in the flour. Another simple test, easily made under a microscope, is the bran count. At a magnification of about 8 diameters the yellowish-brown bran particles can be readily discerned in the flour. The "bran number" is therefore proposed as a suitable criterion for grading wheat and rye flours. It is defined as the number of bran particles per square decimeter of flour surface and is measured by pressing the flour flat on 30 sq.cm. of surface and counting the bran in each sq.cm. successively for light colored flours, or in 1 or 2 strips 1 mm. wide across each sq.cm. for dark flours. The average of the 30 (or 60) counts, recalculated to the square decimeter, is the bran number.

There is a definite relation between bran content and ash content, as shown by a large number of tests with Austrian, Hungarian and American wheat flours and several varieties of rye flour. The test cannot be used to grade flours according to baking properties, but is important in other respects and could be used to good advantage as a reasonable and equitable standardization basis in food laws, the ultimate criterion being ash content. This work was done under the auspices of the Editorial Committee for the *Codex Alimentarius Austriacus*.

Digest from "Flour Standardization Problems," by V. Moucka and R. Muller, *Osterreichische Chemiker-Zeitung*, 40, 81, 1937. (Published in Austria)

CANNED FOODS

Whole Tomato Pack

RETENTION OF SHAPE, texture and taste characteristic of the raw fruit is claimed for tomatoes canned according to procedure given in U.S. Patent No. 2,073,340, granted March 9, 1937 to Edward C. Eberts, Indianapolis, Ind.

Tomatoes used for this type of pack are selected on the basis of size and maturity. The outside diameter of the fruit is practically the same as the inside diameter of the can to prevent shifting or squeezing during processing and handling and the depth is such that three tomatoes just fill the can when placed axially one on top of the other in the can. Tomatoes on the slightly under-ripe side of maturity are preferred because they are not so likely to become mushy during processing. Those showing some green at the stem end give best results.

These selected fruits are stemmed, cleaned, scalded in the usual manner for careful removal of skin, and placed in the cans with the spaces between them filled with tomato juice. The filled cans are passed through the customary vacuum box or steamer to remove the greater part of occluded air and to raise temperature to about 140 deg. F. After about five minutes in the vacuum box, the filled cans are subjected to a temperature of 210 to 212 deg. F. preliminary to sealing. The sealed cans are then placed on their sides in suitable crates and held quietly in a hot water bath or some such heating medium at a temperature above 175 deg. F., but below 212 deg. F., so that the contents of the cans will be at 175 deg. F. for at least 15 min. The heating period may be as long as 45 min. without injurious effects on the fruit.

While still on their sides and without agitation of their contents, the cans are then cooled to atmospheric temperatures after which they may be handled for storage or shipment in the usual manner without breaking or mashing up of the fruits.

Tomatoes so processed are supposed to be thoroughly sterilized for indefinite periods of storage and suitable for slicing or quartering when removed from the cans. As long as the filled and sealed cans are kept on their sides in the crates and handled so as to keep the contents in a quiet state the loaded crates may be handled through a 190 deg. F. open water bath in a continuous manner from an overhead trolley system.

Benzoate of Soda Prevents Vegetable Darkening

PEELED POTATOES held 48 hours in a 3 per cent water solution of sodium benzoate do not darken when grated or macerated and exposed to air according to disclosures made in U.S. Patent No. 2,069,884, granted Feb. 9 to Edward G. Jansen, Sheboygan, Wis.

Salicylic acid and other preservatives are cited as also being effective but preference for sodium benzoate is specifically stated.

This disclosure has commercial value in the preparation of large quantities of peeled potatoes to be packed and marketed in the ground or cut form to be mixed with flour or other ingredients for marketing as a prepared mixture such as potato pancakes.

After treatment with the benzoate solution the potatoes are rinsed in cool water, grated or chopped into finely divided state, passed over a screen for separation of liquid portion and freed

starch particles, and packed for market either with or without addition of other ingredient materials. If desired, the ground product may be dried in a vacuum and marketed in dry form without loss of normal color.

Bigger and Better Tomatoes by Irradiation

IN A SERIES OF EXPERIMENTS to ascertain the influence of irradiation with ultraviolet light on plants, some remarkable results were obtained with tomatoes. When the conditions with respect to time of exposure and intensity of the ultraviolet light were properly selected, tomato plants could be made to ripen their fruit ten days ahead of like plants which were not irradiated. To speed up ripening in this way it was not necessary to be content with dwarfed tomatoes or a diminished crop. On the contrary, the irradiated plants yielded more tomatoes than the others, and the average size was larger. Thus the grower receives a triple benefit from irradiating his plants.

Digest from "Effects of Ultrashort Waves on Yield and Ripening of Tomatoes" by P. N. Tishchenko and P. O. Kopuilov, *Konservnaya Promyshlennost*, pp. 37–38, No. 3, 1936. (Published in Russia)

CEREAL PREPARATIONS

Improvement in Rye Starch Manufacture

A PROCESS FOR MAKING RYE STARCH, patented in 1931, utilized a centrifugal method for separating starch from the rye proteins in a hot-water dispersion containing 0.5 per cent lactic acid. The method was simple and effective, but left much to be desired in mechanical efficiency and was subject to considerable interference due to frothing. The inventor, Friedrich A. V. Klopfer of Dresden, has now disclosed in German Patent 639,609 (issued Dec. 9, 1936) a simple but important modification which greatly increases the efficiency of the starch-protein separation. By adding 1 per cent instead of 0.5 per cent lactic acid, and introducing also 0.5 per cent ethyl acetate to the dispersion of rye flour in hot water, the frothing nuisance is completely eliminated. The separation also becomes more rapid so that the operating time is shorter, and more concentrated rye flour dispersions can be used while at the same time the viscosity of the system is decreased. The viscosity reduction means a saving in power costs, as does also the shorter running time for the centrifuge. The higher concentration means ⅓ less water, permitting the use of ordinary, instead of oversize, stirring vats and centrifuges.

Hard Grits from Soft Wheat

TO MAKE HARD GRITS from soft varieties of cereal grains, especially from soft wheats, the grains are cracked or ground to the desired particle size and heated in a sealed vessel without adding any water or steam. As disclosed in French Patent 803,810 (granted Oct. 9, 1936 to Heinrich Auer Mühlenwerke Aktiengesellschaft) the conversion of a soft grain to a hard grit depends on hardening the protein. It is not necessary to rely on the heat treatment alone, because certain edible acids which have a hardening effect on the cereal proteins may be employed to good advantage in conjunction with the heat treatment. The added acid may be citric, tartaric or lactic acid. The intensity of the heat treatment depends on the kind of grain and the operating conditions. The temperature may be between 70 deg. and 120 deg. C. (158 deg. and 246 deg. F.) and the time may be from 40 to 60 minutes. If preferred the heating may be in an open vessel, but in that case the loss of natural water from the grain must be kept compensated by introducing water or steam.

FATS AND OILS

Blown Cocoa Butter To Prevent Chocolate Bloom

BLOWN COCOA-BUTTER has the property of preventing fat bloom in stored chocolate in which respect it is greatly superior to lecithin or other anti-bloom agents.

Very small amounts (0.5 — 1 per cent) of air blown cocoa-butter (Iodine No. = 20) added to olive oil permits it to remain a clear liquid without depositing stearin on storage at 2 and 4 deg. C. The effect persists for years. Untreated oil sets solid within twelve hours under these conditions. This inhibitory effect is a quantitative guide to the anti-bloom effect of cocoa butter in chocolate preparations.

Digest from a preliminary communication by William Clayton *et al*, of Crosse and Blackwell, Ltd., of London. *Nature*, 138, 801, 1936. (Published in England)

Evaluating Bleaching Earths

DIFFERENCES IN BLEACHING EARTHS are recognized in the trade and so the makers produce a number of grades, specifying for each the oils for which it is most suitable. But it is not sufficiently well understood in the trade that each bleaching earth has a characteristic curve representing its decolorizing power for a given oil, and tests made with a single percentage of bleaching earth are likely to lead to erroneous grading. The entire curve should be known for each earth and each oil before recommendations are made. This has been confirmed by recent tests with several earths, all recommended for rapeseed oil. Their curves as measured in two different rapeseed oils showed a reversal of potency, the poorest in one oil being the best in the other. These differences would not have been clearly disclosed by tests made only with 2 per cent of bleaching earth, but are plainly apparent in the curves from 1 to 10 per cent. For the proper evaluation and most efficient utilization of bleaching earths they should therefore be tested, not only over the entire range from 1 to about 10 per cent, but also for two or more oils of like type but different origin.

Digest from "Individual Suitability of Different Bleaching Earths for Decolorizing Different Oils," by E. Erdheim, *Oele, Fette, Wachse, Seife, Kosmetik*, No. 2, 24, 1937. (Published in Austria)

Edible Oils in Industry

DIVERSION OF EDIBLE OILS to industrial uses is an expedient which might be helpful in southern Europe and northern Africa where vegetable oils are relatively much more plentiful than mineral oils. For example, corn oil and rapeseed oil resemble olive oil in physical properties, and any of these can be processed for use in lubricants. When "bodied," either by blowing with air or by treatment with a silent electric discharge, these oils become soluble in mineral oils and so can be used in blended lubricants.

Olive, cottonseed, sunflower seed, rapeseed, linseed and corn oils are less viscous than the petroleum lubricants, but they are superior in lubricity and adhesion to metal surfaces. They also have better properties at winter temperatures because their viscosity does not increase so rapidly in the cold. On the other hand, the vegetable oils are more sensitive to oxidation than the mineral oils; but this can be overcome by adding about 0.5 per cent of an antioxidant such as naphthol, naphthylamine or pyrogallol.

Another important field for vegetable oils is their potential use as diesel fuels. They are barred from that use by their high price in normal economic conditions but could be used very effectively when conditions demand it. The situation is similar with the well-known process (demonstrated by Mailhe to be feasible) for making gasoline from palm oil, cottonseed oil, olive oil or the like by catalytic decomposition in presence of copper turnings. The cost is prohibitive in the normal course of commerce and trade, but gasoline could be produced in this way in case of emergency shortage.

Digest from "Vegetable Oils as Substitutes for Mineral Oil Products," by M. Freund, *Oele, Fette, Wachse, Seife, Kosmetik*, 1, No. 15, 5-7, 1936. (Published in Germany.)

DAIRY PRODUCTS

Casein Preparations

IN A NEW METHOD for working up acid-precipitated casein, either food products or medicinal preparations can be obtained, according to the composition and treatment of the final product. The precipitated casein, with sufficient added water to give a total water content of 25-32 per cent, is mixed with a substance capable of reacting with casein and is thoroughly kneaded in a mixer. This operation is carried out under sufficient heat and pressure to plasticize and homogenize the entire mixture. In examples, as disclosed in British Patent 453,305 (granted Dec. 3, 1936 to H. V. Dunham, Casein Mfg. Co. of America), the added substance which is capable of reacting with casein may be sodium bicarbonate or potassium phosphate or, for medicinal uses, iron lactate. Depending on the nature of the desired product other materials may also be introduced. Among those which are specified are dextrin, starch, glycerin and vegetable seed meals.

Copper Causes Oxidized Flavor

CONTAMINATION OF MILK by copper has a different effect depending on whether it occurs before or after pasteurization. If contamination occurs before pasteurization, amounts up to 2.5 parts per million do not cause much oxidized flavor to develop. The real trouble comes if the same contamination occurs after pasteurization and raw milk acts in the same way.

Digest from "Oxidized Flavor in Milk" by Brown, Thurston and Dustman. *Journal of Dairy Science*, 19, 753, 1936.

Non-Curdling Milk

CONTROL OVER and even elimination of the curdling of milk in the human stomach is claimed to result from the addition of an alkali-metal metaphosphate, preferably sodium hexametaphosphate, or Graham's salt, to the milk. Lowered concentration of the calcium ions in the milk is given as the explanation.

Addition of the metaphosphate is not for the purpose of removing the calcium from the milk. Instead, the sodium metaphosphate is regarded as combining with the calcium ions to form a slightly ionized water soluble calcium-sodium metaphosphate complex.

According to U. S. Patent No. 2,064,-110 the degree to which the calcium-ion content of the milk is reduced determines the curdling or coagulating property of the milk. If enough metaphosphate is added no curdling will take place. Whether the milk is liquid, evaporated, or powdered or in mixed preparations apparently makes little difference except that the metaphosphate must be added after the concentrating or powdering heat treatment. While the sodium hexametaphosphate is preferred the di- or the tetra-metaphosphate may be used as also may the metaphosphates of potassium, ammonium and lithium.

The patent was granted Dec. 15, 1936, to Ralph E. Hall, Mount Lebanon, Pa., assigned to Hall Laboratories, Inc., Pittburgh, Pa. and refers particularly to the treatment of milk used in preparations for feeding infants and persons needing special diets because of having delicate digestive systems.

BEVERAGES

Boric Acid not Satisfactory as Disinfectant

In a study of the influence of boric acid on yeast the interesting and surprising discovery was made that most commercial boric acid solutions were themselves infected in various degrees. The micro-organisms most frequently found were: red *Torula* yeasts; the otherwise rare "Black Yeasts"; and occasionally *Dematium*, a fungus widely distributed in nature on fruits, wet leaves and grain but also found in brewery cellars, barrels and poorly cleaned pipe lines. Comprehensive biological tests were carried out in order to study the behavior of a number of micro-organisms, generally occurring in breweries and other fermentation industries, toward boric acid in various (1 to 4) concentrations.

Of the true yeasts, bottom fermenting culture yeasts (beer yeast) were found to be less resistant to the influence of boric acid than wild yeasts; *Mycoderma* proved to be the most sensitive of the *Psuedo-saccharomycetes*. Among the molds *Mucors* and *Oidium* showed much higher resistance than *Penicillium*. Of the bacteria investigated, acetic acid bacteria, beer *Sarcina* and some lactic acid strains were destroyed after 24 hours, whereas *Termo* bacteria withstood longer periods of exposure. The fact that the molds, *Monilia, Psuedo-Monilia* and *Penicillium* are quickly destroyed by boric acid is of importance, since these organisms are highly immune to other disinfectants. The organisms directly isolated from the boric acid solutions naturally had attained high resistance to this medium.

Even saturated boric acid solutions do not possess sufficient germicidal power to be considered as an effective disinfectant for the biological control of food plants.

Digest from "The Importance of Boric Acid as Germicide for Brewery Organisms," by H. Schnegg and K. Weigand. *Zeitschrift fur das gesamte Brauwesen*, 59, 109, 1936. (Published in Germany.)

FERMENTATION PRODUCTS

This Should Interest Vinegar Manufacturers

THE CHINESE DIET is notably low in milk and milk products, yet the Chinese seem to be able to get enough calcium. Apparently it comes from cooking cuts of meat containing bone in Chinese rice vinegar, which extracts the calcium. Soy bean sauce also helps in extracting calcium.

Investigations at Oregon State College show that American cider vinegar is equally effective in rendering soluble the calcium in bones and cartilage during cooking. It does not, however, increase the yield of calcium obtained from muscle.

The author suggests that an acid cooked meat dish such as sauerbraten, Swedish tongue with vinegar, pickled pigs feet, lamb stewed with tomatoes, or ham cooked in cider may furnish up to 15 to 25 per cent of the daily calcium allowance for adults. Which idea seems to hold certain sales promotion possibilities for vinegar (or lactic acid).

Digest from "Calcium in Meat Cooked With Acid," by Jessamine C. Williams. *Food Research* 1, 537, 1936.

Citric Acid From Molasses

AS ONE MORE STEP in the competition between cheap fermentable sugars and the citrus fruits as sources of citric acid, an improved method has been developed for fermenting molasses mashes with selected strains of organisms which form citric acid from sugars. The acidity and the composition of the mash are adjusted to give the best yield of citric acid, and in particular a mash is used which already contains at least a little citric acid. The concentration at the time of inoculating may be from 0.1 to 15 per cent citric acid. The optimum acidity is relatively high, namely about pH=2.3 (any value of pH below 7 indicates that the solution is acid, and the smaller the pH value the higher is the acidity).

The preferred organisms to be used in the fermentation are *Aspergillus niger* and *Mucor priformis*. As described in French Patent 801,273 (granted July 31, 1936 to Jacob Nussbaum), the optimum acidity is maintained by the judicious introduction of hydrochloric or sulfuric acid, to make up any deficiency, and of sodium carbonate, to neutralize any excess acidity. Fermentation accelerators are used; these may be salts of uranium, manganese or zinc, alone or in mixtures with each other, and as little as 0.001 per cent of the salts may give a useful accelerating effect. Ammonium, magnesium, sodium

(*Turn to page* 287)

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Small Vacuum Dryer

EXPERIMENTAL OR LABORATORY DRYING of food materials sensitive to heat, can be carried out in the new laboratory vacuum dryer No. 51, made by F. J. Stokes Machine Co., Philadelphia, Pa. The design is compact, with the condenser and receiver forming the stand for the vacuum chamber. This chamber, made of special cast iron, contains two 18x14-in. shelves, set with 4 in. clearance between. The condenser is of the counter current type. After condensing, the moisture or solvent is collected in a receiver in the base of the stand. The dryer is supplied with the Stokes Model 146-C high vacuum pump; or, for vacuums up to 29 in., with a reciprocating type pump.

It is claimed that, with this dryer, the same results are obtainable as with large size plant dryers.

Dairy Equipment

THE "LO-VAT" PASTEURIZERS, made by The Pfaudler Co., Rochester, N. Y., have been improved, and some distinctly new features have been added to this line of glass-lined steel dairy equipment. One improvement is the adoption of "stream-flo" agitation, which eliminates foaming and splashing as the tank empties. The cover counterbalance has been changed so that the cover locks in place when fully raised. These features are shown in Fig. 1.

Another new feature is the "DX" coil shown in Fig. 2. This coil is offered in two designs, one for use on the "Lo-Vat," the other on milk storage tanks. In either case, they are for cooling any milk product except condensed or evaporated milk, among which are cooling and holding ice cream mix to a temperature around 35 deg. F., and cooling and holding milk at about 45 deg. F. The internal construction of the coils is such that liquid ammonia is gasified before passing halfway through, and the liquid ammonia is introduced into the coils at high velocity. The control on this design of coil is of the direct expansion, instead of the gravity float valve, type. Freon, methyl chloride and sulphur dioxide can be used as refrigerants for these coils, as well as ammonia.

In Fig. 3, is the "Rotorcoil," a new unit for inclusion in the "Lo-Vat" for such purposes as making buttermilk or pasteurizing cream. This is built for use in 60, 100, 200 and 330 gal. units. Its surface is 20 sq.in. per gal. of tank contents. It is made of tinned copper, or stainless steel. The spiral construction is designed to give agitation that is thorough yet gentle. Drive is by a directly connected single speed motor drive assembled on the cover lift arm.

Beverage Water Cooler

IN THE BOTTLING of carbonated beverages it is essential to cool the beverage water before carbonation, in order to increase the capacity of the liquid to absorb the carbon dioxide gas. With warm water, efficient carbonation requires high pressures that complicate the process and increase its cost.

A cooling device has been developed for this purpose by Frigidaire Corp., Dayton, Ohio. It consists of a water-cooled compression refrigeration unit, in one of a range of sizes up to 20 hp., and one of several types of water cooling units suitable for bottling plant service.

Corn Canning Equipment

THE UNITED CO., Westminster, Md., has brought out new models of the "Tuc" corn husker and "Tuc" corn cutter, for use in corn canning operations. Both machines have been completely redesigned.

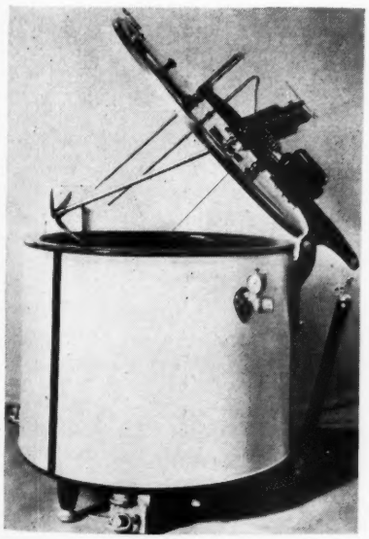


Fig. 1. "Lo-Vat" pasteurizer equipped with "stream-flo" agitator.

Fig. 2. "Lo-Vat" equipped with "DX" direct expansion cooling coil.

Fig. 3. "Rotorcoil" mounted in a "Lo-Vat" for making buttermilk, or pasteurizing cream.

The husker has been made to accommodate all sizes of ears within the full range of all varieties of both white and yellow sweet corn. It operates at higher speeds, with average capacities of from 1½ to 2½ tons of unhusked corn per hour. It is designed to insure smooth. straight passage of any ear, regardless of size or shape, throughout its course of travel in the machine. Also, refinements have been added to avoid any possibility of damage to the corn.

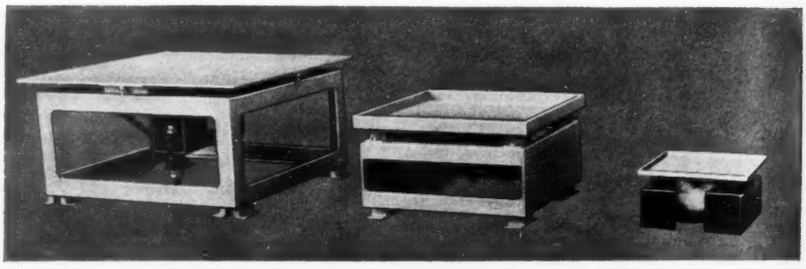
The cutter has been redesigned to increase its capacity and to make it flexible enough to cut properly ears of all sizes, shapes, or stages of maturity. It will handle from 32 to 48 cases of cut corn per hour.

Portable Fumigator

FLOUR MILLS, food warehouses and other structures requiring fumigation can be served by a portable hydrogen cyanide generator, recently developed by E. I. du Pont de Nemours & Co., Wilmington, Del. The generator is designed to produce hot hydrocyanic acid gas when charged with sodium cyanide, sulphuric acid and water and set into automatic operation. Sufficient pressure is developed to force the gas throughout the space being fumigated. The generator is operated from the outside of the fumigated space, the gas being introduced through a hose or gas outlet. As all the operation is carried on from without the fumigated space, it is unnecessary for the operator or anyone else to be exposed to the gas at any time, since the fumigated space can be ventilated before it is entered.

The generator comes in three sizes with fumigating capacity up to 10,000 cu.ft., 25,000 cu.ft. and 100,000 cu.ft. respectively.

Portable HCN fumigating generator.



Three sizes of vibrating packing machines.

Five Gallon Shipping Pail

NATIONAL STEEL BARREL CO., 3850 East 91st St., Cleveland, Ohio, has introduced a line of 5 gal. pails, equipped with the tight-sealing, easy-to-open, "Quick-Lox" ring. These pails are for shipping solid, semi-solid and liquid materials.

Five-gallon shipping pail.

As can be seen in the photograph, when the ring is removed, the entire head can be taken off. This avoids the necessity for exact spotting when filling, and reduces the likelihood of spilling.

Heads are gasket lined. Provision is made for wire-sealing to prevent tampering. Heads may be fitted with pull spouts, or other fixtures, as desired. Pails are in various color combinations, as desired, and may be printed or lithographed.

Control Instruments

MODEL D40M is a new series of low-range recorders and controllers put out by the Bristol Co., Waterbury, Conn. These instruments are equipped with inclosed bell type measuring elements and are offered for draft or pressure in minimum ranges of 0 to 0.2 in. of water and maximum ranges of 0 to 2 in. of water. The large operating area of the liquid sealed bell gives accurate and sensitive response to very small variations in pressure. The instruments embody the "Ampliset" sensitivity adjustment for synchronizing throttling range with process lag.

Packing Machines

LOOSE FOOD PRODUCTS may be settled and packed more tightly when filled on the vibrating platform of a packing machine made by Syntron Co., 460 North Lexington Ave., Pittsburgh, Pa. There are three sizes: A table size for packages, cartons, cans, jars and sacks up to 50 lb. capacity; a floor model for drums, barrels and sacks up to 300-lb. capacity; and a large floor model for containers up to 750 lb. capacity.

The machines consist of a stiff deck plate to which is attached the company's design of pulsating electro-magnet vibrator. The plate is cushion-mounted on its supporting frame, so that vibration is not transmitted to bench or floor. Deck dimensions range from 11x11 in. to 30x30 in. Amplitude of the vibrations is controlled by a dial switch, the switch and control being arranged for wall mounting. Current is taken from a 110 or 220 volt, single-phase, a.c. source.

Electrostatic Air Cleaner

PANGBORN CORP., Hagerstown, Md., is manufacturing an electrotatic precipitator for removing all types of industrial dusts or fumes except those which are highly explosive or combustible. It

consists of three parts: the collector plate cells, the ionizing assembly and the power pack. These are assembled in standard units, which also include a washing chamber.

In operation, the power pack, by means of vacuum tubes, produces the 12,000 to 15,000-volt current needed for ionization. By means of this current applied to the ionizing assembly, any particles in the air passing through the assembly are ionized. The air then passes through the collector plate cells. Every other plate in this assembly is connected to a direct current source approximately one-half that applied to the ionizing wires. Alternate plates are grounded. A uniform electrostatic field of relatively high intensity is thus created between the plates.

As the air, with its ionized particles, passes through this electrostatic field, the particles are attracted to, and deposited on the grounded plates. At intervals these plates are cleaned by rapping washing, or blowing, depending upon local conditions.

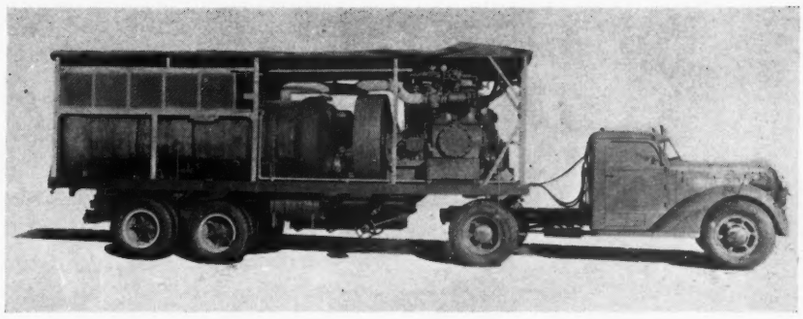
Small size, high efficiency of dust or fume removal, low power consumption, and constant flow resistance are advantages claimed for this air cleaner.

Coordinated Control

A NEW COORDINATED CONTROL SYSTEM, for automatically controlling all of the technical operations and factors of a production routine, has been developed by The Bristol Co., Waterbury, Conn. It is claimed that, with this system, all manual operation in even the most complicated process can be eliminated.

The control system is for processes that depend on rigid control of such factors as the time of operation of valves, pumps, blowers and dampers, and the control at a definite value, or according to a time program, of such variables as temperature, pressure, liquid level, flow, humidity and speed.

The exact sequence of operation, or control point of each factor affecting the quality of product and yield can be built into the system, which consists of recording and controlling instruments and the "Mechanical Brain" for coordinating the action of the various instruments.



Trailer-mounted portable pre-cooling unit.

Trailer-Mounted Precooler

SAFE SHIPPING TEMPERATURES for fruits and vegetables can be obtained through the use of a trailer-mounted, portable pre-cooling plant devised by J & B Trailer Co., 3913 So. Michigan Ave., Chicago, Ill. This is shown in the accompanying photograph. It has a 70-ton Cummins Diesel driven compressor unit of Vilter design, a brine tank and circulating pump. The trailer is a 24-ton B & J Syncro-Float semi-trailer, with tandem axles.

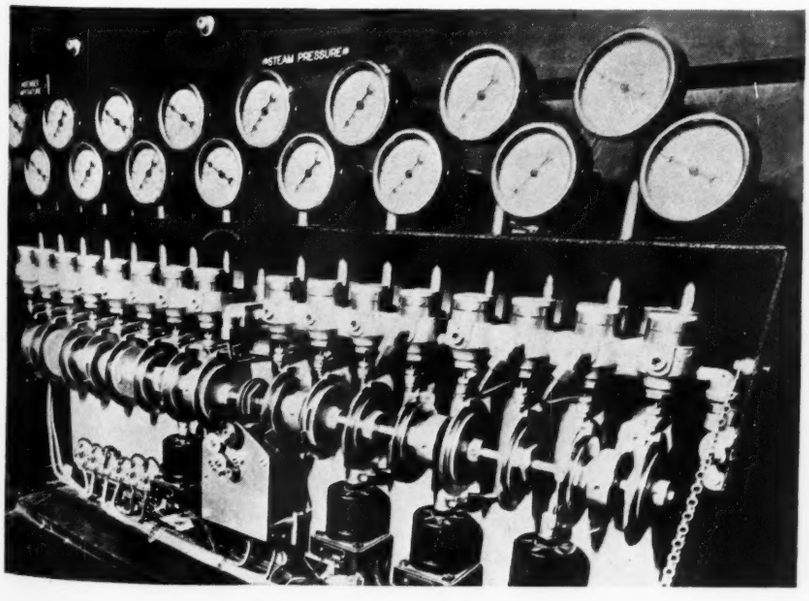
Parked adjacent to a loading dock, the brine tank is connected by flexible hoses to fin-coil pre-cooling units which are placed in the individual cars. Each coil has a motor driven fan for circulating the cooled air. Five cars can be cooled at once. It takes less than two hours to cool a car.

Two of these new portable units are owned and operated by General American Car Co. They are used in the California citrus fruit and lettuce packing plants during peak packing and shipping periods.

Vibrating Screen

ALLIS-CHALMERS MFG. Co. has recently placed on the market a positive electro-magnetic vibrating screen called the "Utah." With this screen, standard alternating current may be used without resorting to expensive auxiliary equipment such as motor-generator sets. The new electro-magnetic vibrating motor gets its operating power from a small rectifier, together with a small auto transformer and an amplitude adjusting switch for regulating the intensity of vibration.

The use of dual magnets permits the magnetic forces to be applied equally in both directions, avoiding the necessity of using springs or similar devices. The rectifier splits the alternating current cycle into halves and delivers each successive half cycle respectively to the upper and lower magnets. The reciprocating motion is thus produced without any revolving parts. The screen is said to be particularly adapted to meshes with openings of $\frac{1}{2}$ in. or less, on either wet or dry materials. It is available in either open or closed types.



Coordinated process control system.

Positive electro-magnetic vibrating screen.

Just Off The Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

1. Canning Equipment — "Increase the Profit Yield" is the title of a 16-page bulletin describing a complete line of equipment for the canning of tomato products.

2. Corrosion-Proof Equipment — Processing equipment for the food and other industries, made of corrosion-resistant metals, forms the subject of 26-page illustrated catalog.

3. Drying Equipment — Rotary drying equipment for foods and other products, traveling screens, and screw-type dewaterers are described and specified in a new general catalog.

4. Dust Removal —Oval bags for filtering dust from the air of industrial plants, and the design of equipment to accompany them, including bag house, shaker, hopper, and valve, are described in a new 8-page bulletin.

5. Flour Milling Equipment — Purifiers for flour mills are described in a 4-page illustrated bulletin.

6. Mixers and Blenders — Horizontal and vertical, batch and continuous mixers of many types all illustrated, described and specified in a 32-page bulletin.

7. Refrigeration — "Yesterday and Today in Refrigeration" is a new booklet giving a brief history of the development of mechanical refrigeration and its status today.

Plant Accessories and Supplies

8. Boilers — High-pressure boilers of the bent-tube type are described and applications illustrated in a 34-page catalog.

9. Compressors and Vacuum Pumps — Industrial equipment for supplying compressed air or vacuum, ¼ to 15 h.p., 1.2 to 102 cu.ft. per min., pressures up to 1,000 lb. and vacuums to 0.35 in. of barometer, are described and specified in a 28-page bulletin.

10. Diesel Engines — Medium high-speed diesel engines from 10 hp. up, for industrial power supply, described and illustrated in a 16-page bulletin.

11. Flexible Coupling — Roller chain flexible couplings for connecting driving and driven shafts are the subject of an 8-page illustrated bulletin.

12. Packing, Belts, Leather Products — Power transmission belts, machine belts, leather packing and gaskets, valve leathers and industrial leather specialties are described in a 32-page illustrated catalog.

13. Packing For Food Equipment — Complete information concerning the choice and application of the correct packing or gaskets for food pipe-lines, valves, pumps and other equipment, is contained in a new 112-page manual for plant engineers.

14. Power Transmission Equipment—Gears, speed reducers and other industrial power transmission equipment are listed and priced in a 1937 edition of a general catalog with 176 pages.

15. Speed Reducers — Worm gear speed reducers, in all industrial sizes and load capacities, are illustrated and specified in a 112-page general catalog.

Packaging

16. Candy Wrapping Machines—Individual wrapping of hard candies by machine is the subject of a new leaflet.

17. Closures — "Better Seals for Better Sales" is a 36-page color-illustrated catalog of molded, metal and cork closures for products packed in glass.

18. Vegetable Parchment — "Food Protection Papers" and "The Story of Parchment" are the subjects treated in a recent broad sheet of a paper manufacturer.

Trucks, Tractors, Accessories

19. Trucks and Tractors—"Prevision Methods" is a 64-page bulletin, well illustrated, describing the methods used by a large manufacturer in constructing tractor equipment.

20. Trucks and Tractors — "25th Anniversary" is a 24-page bulletin illustrating applications of trucks and tractors to hauling foods and other products.

Control Equipment

21. Control Instruments — Non-indicating, temperature and pressure control instruments for industrial plants are described, and their aplications discussed and illustrated, in a 32-page bulletin.

22. Flow Meters — Indicating, recording and integrating flow meters, both electrical and mechanical types, and flow and liquid level controllers are described, and their application explained, in a new 56-page catalog.

Laboratory Equipment

23. Laboratory Instruments — Thermometers and hydrometers for use in research and control laboratories are the subject of a 16-page illustrated bulletin.

Food Ingredients

24. Dry Milk — "Charting the Course" is a short discussion of various methods of making dry milk, with statistics of the industry.

Food Distribution

25. Cooler for Beverage Dispensing — "Kooler-Keg," a system for beer dispensing that eliminates icing and accurately controls beverage temperature, is the subject of a recent bulletin.

26. Shipping Methods — "Acme Unit-Load" is a booklet describing methods of bracing carload freight, whether comprised of uniform or mixed loadings.

G. L. Montgomery, Managing Editor, Food Industries, 330 W. 42nd St., New York, N. Y.

MAY, 1937

TO THE READER: Use this convenient form to order the bulletins you need.

Please obtain for me the bulletins indicated by the following numbers:.....

.....

Name.....

Title.....Address.....

Company.....

THEY'RE AFTER YOUR MARKET

Mushrooms In The Spotlight. Grocery Store Products Co. will promote "Jacobs" and "Kenneth" brands of mushrooms in national magazines. The Jacobs brand went on the air April 1, on the "What to Eat and Why" program conducted by Houston Gondiss, "Station WHN, Thursdays, Fridays and Saturdays from 9:30 to 10 a.m.

From Famine to Feast. In this era of weight reducing diet fads, it is certainly encouraging to note the birth and propagation of the gourmet society idea. New York's Gourmet Society, the first of several local organizations, recently celebrated at a State of Maine dinner, the first of a series of dinners planned with the purpose of developing cosmopolitan interest in provincial foods. Food manufacturers hope the idea will spread.

Treasure Hunt Tie-up. A campaign was opened the middle of April with a full color page comic strip advertisement, featuring Bobby Benson, Force's radio child hero, in a large list of papers. The strip pictures adventures in hunting and finding treasures, and the Hecker Products Co. ties in with this idea by putting premium money in each box of Force. This premium money, valued at 2½ cents in trade, is redeemable at stores selling Force.

Scientific Promotion. American Can Co. has prepared 75 abstracts which tabulate the vitamin and food essential content and disease preventing qualities of commercially canned foods. Each abstract is on a separate card (for mailing on request only) with references from which the material was taken.

Customer for Life. Phillips Packing Co. featured George Rector in the March 29 issue of *Life*, using a full page color advertisement. Color pages will appear later in *McCalls* and *Ladies Home Journal*. Tied up with this magazine campaign is a 32-station network broadcast, also featuring George Rector.

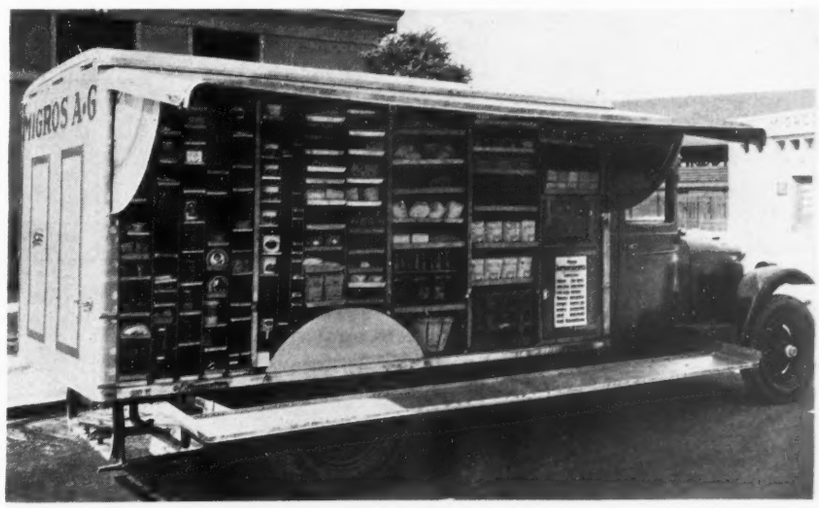
To Solve a Competition Problem. Ice cream made at home in the mechanical refrigerator has been an unchecked competitor of the ice cream manufacturer's product. But now, new ice cream packages, wrapped in glassine, waxed paper or cellulose, to prevent odor contamination, are available in sizes that fit the compartments of mechanical refrigerators. Because of this convenience, the housewife can buy ice cream on the regular trip to the market, place it in the freezing compartment of her refrigerator and serve when convenient. The Ice Cream Merchandising Institute has prepared a leaflet that is available to promote sales of this size of package and provide instructions for several methods of decorating this ice cream at home.

State the Facts. Forty thousand members of 250 metropolitan women's clubs, including American Association of University Women, American Home Economic Association and the National Congress of Parents and Teachers, have adopted as their slogan, "the women want to know." Here is a slogan which a few food manufacturers have already applied to their advertising, extending it, however, to present to American women facts (and, at this time, very important facts) about their business structure as well as about their products.

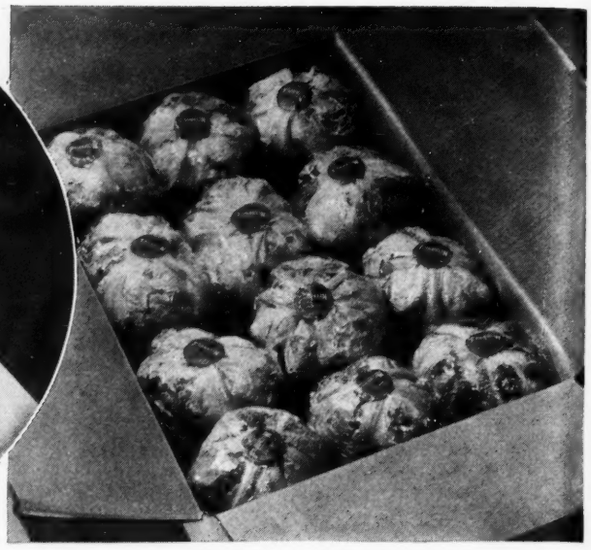
"The Bread Diet." Standard Brands has just published a 16-page booklet to be distributed through Fleischmann's Yeast to the bakers for further distribution to the consumer. This booklet features the importance of bread in the diet, especially in a reducing diet. Bakers are also being furnished with advertisements to be used in local newspapers. These advertisements carry coupons to induce consumers to send to local bakers for copies of this interesting booklet.

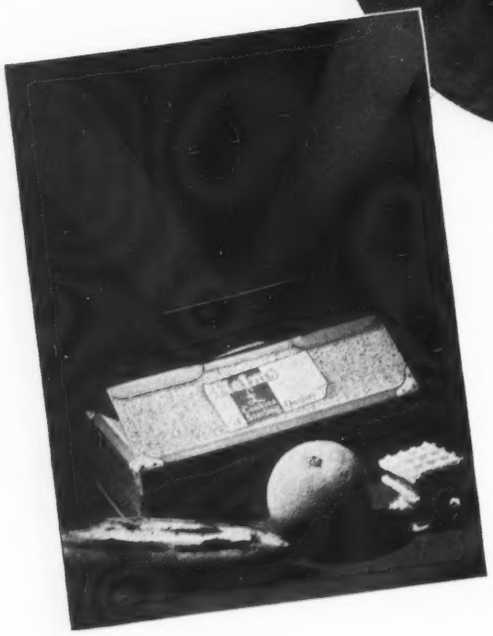
Boost for Private Brands. Practically every packaged item in the grocery store can and will be judged by scientific standards, rather than by reputation. So says Piggly Wiggly Corp., which has set up a laboratory service to test packaged merchandise for its operators.

National vs. Private Brands. Members of Associated Grocery Manufacturers of America contemplate an offensive in the battle of the brands, by an advertising barrage over an association seal. If the program is adopted, to each package of A.G.M.A. members' products will be attached a seal which will guarantee that the product has been manufactured under fair labor conditions, that the manufacturer has complied with all laws of sanitation in the manufacture of a product from first-class material, and that the price is fair and justified. This seal will, if the program is carried to completion, appear in advertisements designed to publicize in detail the quality of ingredients, labor and plant conditions of cut-price products sold under distributors' labels. If the proposed Associated Grocery Manufacturers of America plan is approved, and put into action, it should serve to raise the standard of all food products.



In Switzerland, when the consumer can't get to the store, the store goes to the consumer with a hundred or more staple items of food. Migros, who operates a fleet of these traveling chain stores, was once an American chain store employee.





New PACKAGES AND PRODUCTS

Of Re-use Appeal To Children

DURING THE SCHOOL SEASON, Helms Baking Co., Los Angeles, features on its delivery routes, cookies in a package with a handle, suitable for re-use as a lunch box. The advertising on the container is minimized to short circuit child prejudice. Cooky sales are said to be stimulated.

Assures Cocktail Success

COCKTAIL PARTY HOSTS and inexperienced bartenders can now mix "old fashioned cocktails" with the assurance that each succeeding drink will be just like the preceeding. "Cocktail Bitters," product of Mario Gianini, New York, are sugar cubes, each containing sufficient bitters and herb extractives to flavor one "old fashioned" cocktail. Included in the transparent cellulose wrapped package of 25 cubes is a wooden pestle for crunching and mixing the sugar cubes.

New Use for Oranges

ORANGE BUTTER, a spread less rich than marmalade and free from the bitter tang, is reported by the manufacturers, Tree Sweet Products Co., to have an especial appeal to children, who prefer it to marmalade. Tree Sweet Orange Butter, processed from whole peeled oranges, entered the market early this year. West Coast distribution is being followed by sampling of a wider area.

Puts Crunch In Peanut Butter

CRUNCHING PROPERTIES have been added to ordinary peanut butter by Holsum Products, Milwaukee. Small particles of nut mixed with peanut butter bring the teeth into action and provide the crunch in "Peanut Crunch." The successful distribution of the product, introduced since the first of the year, is attributed to the use of direct mail. A single mailing to jobbers and chains east of the Rocky Mountains brought a 12 per cent response; follow-ups, an additional 5 per cent, requesting samples. Samples brought sales from approximately 3 per cent of the original list, more than half of whom have reordered.

Apples in New Forms

OREGON APPLE GROWERS are preparing apples for the market in new forms that suggest new uses. One of these is the Puffed Apple, similar in appearance to the puffed grains used as cereals. Apples in this form may be used as a breakfast food without sugar, or converted in a few minutes to applesauce. Another type of apple product has been developed by Dr. Ira A. Manville, director of the nutritional laboratory at the University of Oregon medical school. This apple product is a powder, said to have not only nutritive

value, but therapeutic value as well. In its pulverized form, Dr. Manville claims the apple is more beneficial than raw apple, and that, mixed with cow's milk, the mixture is more nutritive than mother's milk.

Trade Branded Vegetables

M. FREEMAN, New York, has placed the brand name "Franklin" on transparent cellulose wrapped boxes of brussels sprouts and on individual heads of lettuce. Aside from permitting branding, the wrapping improves the appearance and preserves the freshness of both. It is particularly important to preserve the outer green leaves of lettuce, for they contain more nutriment than the inner leaves.

Monogrammed Restaurant Butter

RESTAURANT AND CAFE BUTTER can now bypass the butter bowl and reach the guest direct from a refrigerated package of 8 or 10 molded monogrammed "Ehlenpats," product of Geo. Ehlenberger Co. Ehlenpats, served by waiters from the original package, opened in the presence of the patron, are said to insure maximum sanitation and a saving of 2 cents per pound.

Apples Improve Apricots

IT HAS LONG BEEN KNOWN that apricots contribute valuable nutriment to the infant diet, but their tart taste has been a decided disadvantage. Gerber Products Co., Fremont, Mich., has overcome this objection by adding apple sauce in the preparation of a strained food for baby and special adult diets. Because the product is prepared in strained or pulped form, full-ripe apricots and apples can be used. This has the double advantage of eliminating most of the tartness of the apricots and retaining the maximum vitamin content. The texture makes the product suitable as an ingredient in gelatine and frozen-fruit desserts.

Simple Tamper-Proof Device

GLASS JARS that may be re-used for canning have always been popular with many housewives, including those jars with clamp-on glass lids. There is, however, one quite objectionable feature to this type of jar closure: it may be opened to admit air and accelerate rancidity. To prevent any possibility of the jar being opened before purchase, Ivanhoe Foods Co. has secured the clamp on the "Ivanhoe Mayonnaise" container by a shrunk-on band of heavy weight red transparent cellulose. The band must be severed before the lid can be removed. The unbroken red seal guarantees that the lid has not been removed since packaging.

New Canned Ice Cream Mix

BY THE ADDITION of 1 gal. of water and flavoring to a No. 10 tin of concentrate, small manufacturers can prepare, ready for the freezer, a standard ice cream mix from "Milx," product of Creamy Products Co., East Newark, N. J. This concentrate is made from a standard mix containing milk, cream, sugar and sufficient gelatin, pasteurized, evaporated to a paste and vacuum sealed in sterilized cans. Milx, which keeps in any climate, can be stocked and used as needed. Its use eliminates the purchase and handling of milk products from producers.

Appetizer From Corn

A NEW APPETIZER that tastes like buttered pop corn is the product of Tosto Foods Co., Cincinnati. "Corn Chips" are made from whole grains of white corn, processed into crisp thin crunchy ribbons. On the white lithographed tin container, Tosto Foods suggests its product as an appetizer to go with soups, salads, cocktails, or as an any time snack. Corn chips are packed in 1 lb. and ½ lb. cans, 12 and 24 to the case. Wide and rapid distribution has been obtained through quality outlets.

BUSINESS TRENDS

Commodity Prices React

PRICE LEVELS of the raw materials used by food manufacturers continue, as in the past several months, to be the most important factor in food business trends. After the reaction in mid-March, the upward trend promptly recommenced. Toward the end of March, considerable nervousness appeared in speculative markets in commodities, but the advance was resumed. By April 6, price levels reached new highs, with grains, particularly corn, hogs, cattle, flour and oils all taking part in the upward movement. By mid-April, however, reaction had set in, and the price trend turned it lower. A week later prices steadied.

This reaction was to be expected, for apparently much of the recent gain had been made without respect to the favorable outlook for larger crop output in 1937. Prospects for domestic crops of grains and vegetable oils are definitely good at the time of writing. The situation as to domestic cattle production remains unchanged from previous forecasts. Foreign production of grains, fats and oils is estimated to be on the increase. With these facts in mind, it is evident that some deflation of the speculator's commodity balloon, short of too violent and deep a reaction, should be a healthy occurrence for those who buy these commodities for further processing.

Oil Situation Looks Better

GREATER PRODUCTION of cottonseed oil for 1937 is forecast by the larger plantings that are expected to result from high cotton prices. Planted acreages of both peanuts and soy beans are also expected to be larger this year. In addition, lard output is greater than had been expected, with the result that lard supplies are accumulating. Finally, supplies of imported vegetable oils under future contract seem ample. As a result, the present prospect is for a supply of edible fats and oils in 1937 that will be fully adequate for domestic needs. This outlook is strengthened by the recent drop in coconut oil prices, which is apparently based on prospective greater shipments of copra.

Construction News

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1937 (thousands)
Bakery	$320	$90	$434
Beverages	1,120	1,675	3,627
Canning and Preserving	120	235	315
Confectionery	90	....	....
Grain Mill Products	1,500	40	1,202
Ice Manufactured	740	40	125
Meats and Meat Products	220	....	1,010
Milk Products	2,250	80	2,383
Miscellaneous	160	1,335	3,505
	$6,610	$3,495	$12,601

Winter Wheat Record Forecast

PRODUCTION OF WINTER WHEAT IN 1937 was forecast at 656,000,000 bu. in the April 1 crop report of the U.S. Department of Agriculture. This output would be 25 per cent more than the 1936 winter wheat crop, and would be the largest return since 1931, comparing to the 1928-1932 average of 623,000,000 bu.

Condition of the crop, on April 1, was given at 73.8 per cent of normal, compared to a ten-year average at this time of 78.9, but showing 5.3 points better than last year. The seeded acreage is the largest on record, and the indicated abandonment was reported at 17 per cent, leaving 47,500,000 acres for harvest.

April 1 farm stocks of wheat were reported at 71,723,000 bu., compared to 98,978,000 bu. a year ago, and a 1928-1932 acreage of 127,770,000 bu.

Chicago estimates of the winter wheat yield, made at the same time as the Federal forecast, averaged 655,000,000 bu., with one estimate as high as 690,000,000 bu.

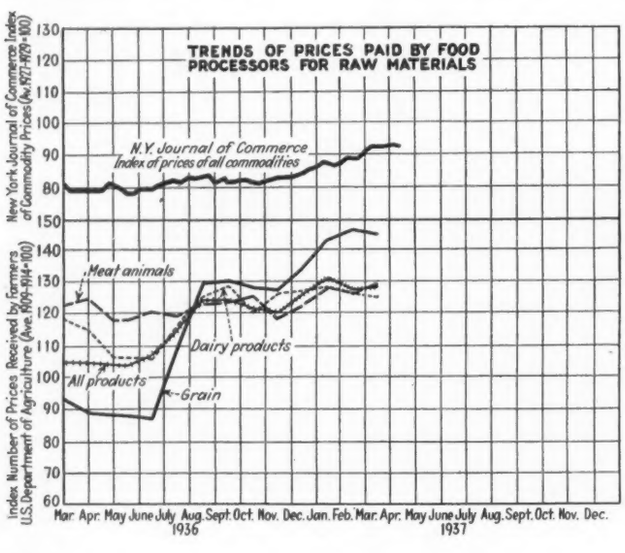
Since April 1, the weather has continued to be favorable, with good rains. So far, there is no reason to look for a smaller wheat yield than the forecast and, if moisture continues to be abundant, the final crop realized may well result in lower prices than those of recent weeks, which, around April 1, were at the highest levels since 1929.

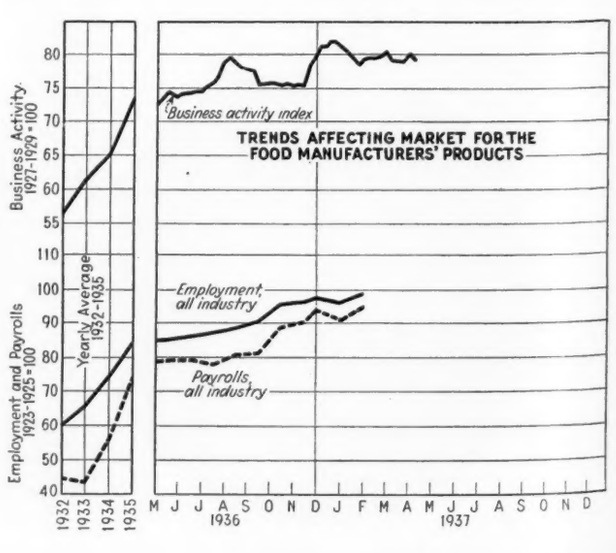
Spring wheat yield prospects are also good. Indicated acreage is 20,918,000 compared to 11,212,000 acres of spring wheat harvested in 1936.

More Frozen Fish

PRODUCTION in no branch of the food industries is growing more rapidly than the freezing of fish. Total production of freezing plants in the United States and Alaska, in 1936, was reported by the U.S. Bureau of Fisheries at 179,274,000 lb. of fishery products. This was an increase of 20 per cent over the 1935 output, 34 per cent over the 1934 output, and 87 per cent over 1933.

The most important varieties of fish frozen were cod, haddock and pollock, including fillets, and amounting to 27 per cent of the output; whiting, 16 per cent; halibut, 9 per cent; salmon, 7 per cent, and mackerel, 5 per cent. Of this total of fish, New England froze 96,173,000 lb.; the Middle Atlantic States,


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
New York Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
N.Y. Journal of Commerce Index of prices of all commodities
Index Number of Prices Received by Farmers U.S. Department of Agriculture (Ave. 1909-1914=100)
Meat animals
Dairy products
All products
Grain
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1936
1937


Business Activity 1927-1929=100
Employment and Payrolls 1923-1925=100
Yearly Average 1932-1935
1932 1933 1934 1935
Business activity index
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Employment, all industry
Payrolls, all industry
M J J A S O N D J F M A M J J A S O N D
1936
1937

Business is Cautious

CONTINUED RESTLESSNESS IN LABOR and uncertainty in finance caused by heavy importations of gold have had a dampening influence upon business ardor since the middle of March. At 78.0 per cent of "normal" for the week ending April 17 the *Business Week's* index of business activity shows a 1.67 per cent drop for the four-week period.

Beneficial effects of the gain in automobile production through the settlement of "sit-down" strikes in that industry have largely been offset by the seasonal slump in coal production. Other factors indicating lessened business activity are the weakening of commodity prices after a several months upward movement and a falling off in check payments outside New York City. The decline in bulk car loadings is closely tied up with the falling off in coal production while the continued increase in steel output reflects the renewed activity in automobile production and the buying of equipment by railroads. Evidence that the volume of manufactured products is steadily growing is found in the monthly increase of less-than-carload shipments. Building continues active.

In spite of the mid-April downward movement in commodity prices retail stores show indications of keeping their prices up. As reported by the U.S. Department of Labor wholesale prices for all commodities advanced 0.80 per cent during the month ending April 10 while those for farm products eased off 0.11 per cent and those for food fell 1.37 per cent. During the four weeks ending April 17 the general weighted price index of the New York *Journal of Commerce* fell 0.76 per cent. The index for grain prices went up 2.19 per cent, while the index for food prices dropped 2.07 per cent.

20,968,000 lb.; the Pacific Coast, 36,579,000 lb.; and all other districts, 26,454,000 lb.

Cocoa Consumption

NEW LIGHT on the consumption of cocoa beans is contained in a recent review of this market released by W. R. Grace & Co. The findings result from a questionnaire covering the entire industry, to which 42 per cent of the manufacturers replied. The figures, which follow, are considered to be the most accurate available:

Year	*Estimated Consumption in Tons*
1926	161,000
1927	174,000
1928	183,500
1929	223,000
1930	167,000
1931	191,600
1932	215,000
1933	190,200
1934	244,200
1935	271,700
1936	300,200
1937 (estimated)	304,900

Sugar Consumption Increases

PER CAPITA CONSUMPTION of sugar in the United States increased steadily during the last 50 years, except for the effect of the 1929-1935 depression years, according to data recently released by Lamborn & Co. Starting in 1886 with a quantity of 56.09 lb. per year per person, the consumption is recorded as follows:

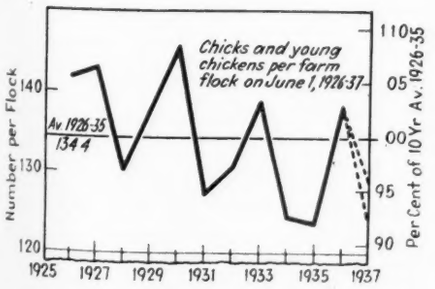
Year	*Per Capita Consumption of Sugar in Pounds*
1886	56.09
1896	65.60
1906	79.97
1916	87.03
1926	117.33
1936	104.44

As an indication of the effect of depression on sugar consumption, the yearly figures for the past decade, from the same source, are enlightening:

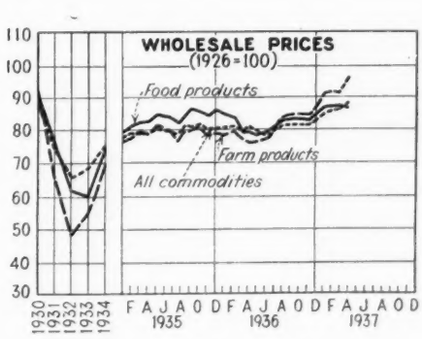
Year	*Per Capita Consumption of Sugar in Pounds*
1926	117.37
1927	111.53
1928	111.10
1929	112.49
1930	111.43
1931	108.00
1932	103.04
1933	101.56
1934	100.00
1935	104.02
1936	104.44

Egg Trade Lags

WITH EGG RECEIPTS at principal markets running lighter than usual for the time of year, an unusually large number of eggs are going into storage. Shell eggs in storage on April 1 totaled 1,406,000 cases, compared to 807,000 cases for the same period of 1936, and a five-year average of 1,211,000. These figures would indicate a definite falling off in the home consumption of eggs. But in spite of this, egg prices have not responded noticeably to the supply situation.



Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. Data on poultry are from the Bureau of Agricultural Economics.



INDICATORS

CITRUS FRUIT AND JUICE PACK in Florida this year, grapefruit and orange, is estimated by Florida Grapefruit Canners Association at 8,000,000 cases.

ORANGE JUICE PACK in 1936 for California, is reported by the Canners League of California at 507,367 cases (48-No. 1 tall), compared to a pack in 1935 of 408,616 cases, same basis.

MEAT IN COLD STORAGE on April 1, at 1,022,635,000 lb. had fallen 57,000,000 lb. from the total reported on March 1, 1936. The five year (1932–36) average of meat in cold storage was 754,054,000 lb.

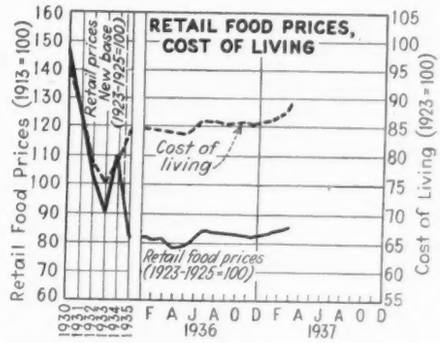
POULTRY IN COLD STORAGE on April 1 totaled 120,420,000 lb., compared to 69,494,000 lb. on the same date in 1936.

SALES OF CONFECTIONERY and competitive chocolate products for February of this year are reported by the Department of Commerce at $16,378,000, an increase of 13½ per cent over the same month of 1936.

CANDY PRODUCTION in January, 1937, is reported by the Corn Industries Research Foundation to have totaled 135,000,000 lb., a decrease in quantity of 5½ per cent as compared to January, 1936, but having a value of $24,173,000 as compared to a value of $20,473,000 in the same month a year ago.

COFFEE DELIVERIES throughout the world, first nine months of the current crop year, beginning July 1, 1936, have decreased 4.5 per cent. In the same period, the United States took delivery on 15.4 less Brazilian coffee and 11.8 per cent more mild coffees than in the preceding crop year.

PURCHASING POWER should be greater, as the U.S. Department of Labor in its last report of employment and payrolls shows that total wage payments are up 133 per cent from the depression low, compared to a rise in the cost of living of 21 per cent.



Keeping Up WITH THE FIELD

Food bill outlook—Sugar measure changed—Food chemists present papers—C.I.O. tangles with Hershey—Brewers form new group

Food Bill Prospects. Fate of the food and drug legislation at the current session of Congress remains anybody's guess, with the edge of the guessing in favor of the contingent backing the Federal Trade Commission's pretentions. Senator Copeland's measure (S-5) slumbers peacefully in the House Committee, where, say the wise ones, it is likely to continue its nap indefinitely, even if a new food and drug measure becomes law.

In its place probably will come the bill fathered by Representative Chapman (H.R.300), and the forecasters are insisting—as much as they insist upon anything these days—that it will emerge from the House little changed from its present form, which is virtually the same as it was in last year's battle.

There is one important exception to that prediction—an exception being made on all sides. It deals with the section of the bill providing for advertising control. This is the storm center in the current session, as it was last year. Congress will be asked, some time before it gets down to action on any food and drug measure, to act on the FTC measure which Representative Clarence Lea, of California, is tenderly guiding and guarding. In that FTC measure there is an amendment, special pet of Representative Lea, giving effective control of advertising to the FTC. Back of that development is a complicated story reaching almost to the horse-and-buggy days, when the F&DA made bitter foes in California by enforcement of regulations for the handling of dried fruits.

If, as now seems more than probable, the Lea measure wins approval in the House and goes to the Senate, the stand contemplated by Congressional leaders will be simple. The contention will be made that since advertising control already has been provided for, there is no need for duplication in the food and drug measures. Hence, that feature is to be eliminated so far as the Chapman Bill is concerned.

When the Chapman Bill gets through the House, an effort will be made to bring the pending Copeland measure into line—not a difficult bit of legislative carpentry—and the resultant conference bill, bearing the name of the House sponsor rather than that of the New York Senator, is expected to be enacted.

LOYALISTS ON PARADE
While sitdowners held the plant of Hershey (Pa.) Chocolate Corp., workers opposing the strike carried placards about the streets to show what they thought of C.I.O.

Hershey vs. C.I.O. C.I.O. has made its first, but probably not last, stand in the food industries. Hershey (Pa.) Chocolate Corp. was the victim. Early in March, the Committee for Industrial Organization had enrolled, according to its claims, 1,000 Hershey employees. On March 9, Hershey announced a voluntary wage increase, but C.I.O. activities did not stop. On March 17, the C.I.O. won a contract making it the sole bargaining representative for all Hershey employees, claiming 1,800 of the 3,000 workers. Then, two weeks later, the union charged discrimination in the laying off of workers following a seasonal decline in the chocolate-coating business. A sit-down strike followed, but came to an abrupt halt on April 7 when farmers, allegedly enraged because their cream market was cut off, threw the strikers out of the factory. On April 11, the trouble was temporarily settled through an agreement between the C.I.O. union and the company. Under this agreement, Hershey took back all employees as of April 1 and agreed to refrain from discrimination. The union promised not to use coercion to sign up workers, and it agreed to balloting as a means of determining whether it represents a majority of the workers, or whether that majority belongs to Loyal Workers Club of Hershey.

Chemists Discuss Foods. Much information important to the food industries was included in papers presented at the meeting of American Chemical Society at Chapel Hill, N.C., April 12–15. A method of creating thousands of new synthetic chemicals from starches, sugars and cellulose was reported by Dr. Claude S. Hudson and Ernest L. Jackson, National Institute of Health, Washington, D.C. Hailed by some as one of the most important contributions to the chemical sciences, the method involves a new way of applying oxygen to carbohydrates.

In a symposium on flavors in foods, the relation of oxidation to off-flavors in milk and milk products was discussed by L. M. Thurston, Dairy Technologist at the University of Florida.

Tallowy flavor in butter and dry milk is the result of oxidation of the butterfat present, Mr. Thurston reported. The reactions are catalyzed by copper, to a lesser extent by iron, and may be catalyzed by silver, nickel or lead. Susceptibility of milk to oxidized flavor is reduced or eliminated by such treatments as homogenization, agitation at low temperature and freezing followed by thawing and heating to 85 deg. C. for five minutes, Mr. Thurston said. In ice cream, a so-called stale-metallic flavor appears to result from oxidation, he reported.

An important milestone in the chemical control of flavor in butter may be the discovery of a method discussed by M. E. Parker, chairman of the research committee of American Association of Creamery Butter Manufacturers, Chicago. The method involves the direct incorporation into butter of the essential flavor constituent of a satisfactory butter culture in the form of a condensate recovered by steam distillation.

Activated carbon can be used for complete removal of taste, and in many cases for selective removal of certain undesirable flavors. This was reported by John W. Hassler, West Virginia Pulp & Paper Co., Tyrone, Pa. The taste removal, however, is limited to products which can be reduced to liquid form, and to those in which the taste results from foreign bodies.

Several canned and preserved foods are improved in flavor by substituting dextrose, or corn sugar, for sucrose in the ratio of 20 to 40 per cent. This was revealed by C. R. Fellers, Massachusetts State College. And dextrose can be substituted in part for sucrose in several other canned foods without affecting the quality. Fermentation is accelerated and a higher final acidity produced by the addition of one per cent of dextrose to cucumber pickle brines, Mr. Fellers reported.

CONVENTIONS

MAY

10–12—Southern Bakers' Association, Grove Park Inn, Asheville, N.C.
17–19—National Cottonseed Products Association, Baker Hotel, Dallas.
18–20—Biscuit and Cracker Manufacturers' Asscciation of America, Palmer House, Chicago.
24–25—American Corn Millers' Federation, Morrison Hotel, Chicago.
24–26—Flavoring Extract Manufacturers' Association, Congress Hotel, Chicago.
24–27—National Confectioners' Association, Palmer House, Chicago.
24–28—American Association of Cereal Chemists, Nicollet Hotel, Minneapolis.
31–June 1—Associated Grocery Manufacturers of America, mid-year meeting, The Homestead, Hot Springs, Va.

JUNE

1–3—Oyster Institute of North America and Oyster Growers' and Dealers' Association, New York.
1–3—American Society of Refrigerating Engineers', semi-annual meeting, French Lick Springs Hotel, French Lick, Ind.
7–11—Association of Operative Millers, with exhibit, Statler Hotel, Detroit.
28–30—National Macaroni Manufacturers' Association, Cleveland.

Brewers Form Liaison. If an industry is to prosper, it must do two basic things—serve the best interests of the public and let the public know that it is serving its interests. No one knows that better than the brewers, who learned it through the sad experience of Prohibition. So the brewers have organized United Brewers' Industrial Foundation, New York, which will function to interpret the public interest to the industry and to interpret the industry to the public. A non-profit incorporated membership organization, U.B.I.F. is supported by contributions from brewers throughout the country. At the helm of its activities is Colonel Jacob Ruppert, who also heads up United States Brewers' Association.

Sugar Bill Changed. Important changes in both tax and quota provisions are embodied in a revised sugar bill placed before the House Agriculture Subcommittee on April 9. In fact, the changes are so important and controversial that enactment of new sugar legislation probably will be delayed for some time.

Proposed by the Administration, the

Performance

Bond

THE INDUSTRIAL CARBURETOR
KEMP

IT is conceivable that even General Baking might make a mistake in equipment now and then, but it isn't reasonable . . . not if you are familiar with the thoroughness of General's purchasing methods, the calibre of the men who do the deciding.

But when General repeats through the years, your stuff must be pretty good.

That's why we want you to know that the Kemp Industrial Carburetor and Kemp Indirect Gas Firing play a part in the colossal job of baking Bond Bread for the more than a million families who eat it every day.

If you're looking, at last, for better results, or lower costs, or both, in baking, roasting or high temperature cooking . . . it's a three to one bet Kemp can answer your prayers. If your not a gambling man, wire us collect. Address the **C. M. Kemp Manufacturing Co., 405 East Oliver St., Baltimore, Md.**

KEMP of BALTIMORE

new measure places Hawaii and Puerto Rico in the category of continental producing areas and permits them to make unrestricted shipments of refined sugar to the mainland.

The bill also substitutes for the original proposed flat tax of 75 cents a hundred pounds, a tax of 69.75 cents for sugar testing 92 degrees by the polariscope, with an increase of 13.125 cents for each degree above 92. Sugar testing less than 92 would be taxed 77.16 cents. These excises are expected to return the same total revenue as a flat tax of 75 cents. The taxes are not retroactive under the revised bill but become effective as of the date on which it is enacted.

The quota provisions allot 55.33 per cent of the consumption requirement to "domestic" producing areas in the following proportions: Beet sugar states, 42.45 per cent; cane sugar states, 9.74 per cent; Hawaii, 25.69 per cent; Puerto Rico, 21.87 per cent; and Virgin Islands, 0.25 per cent. The remaining 44.67 per cent of domestic consumption is allocated as follows: Cuba, 64.41 per cent; Philippines, 34.70 per cent; other countries, 0.89 per cent.

Mid-April

CAPITAL VIEWS

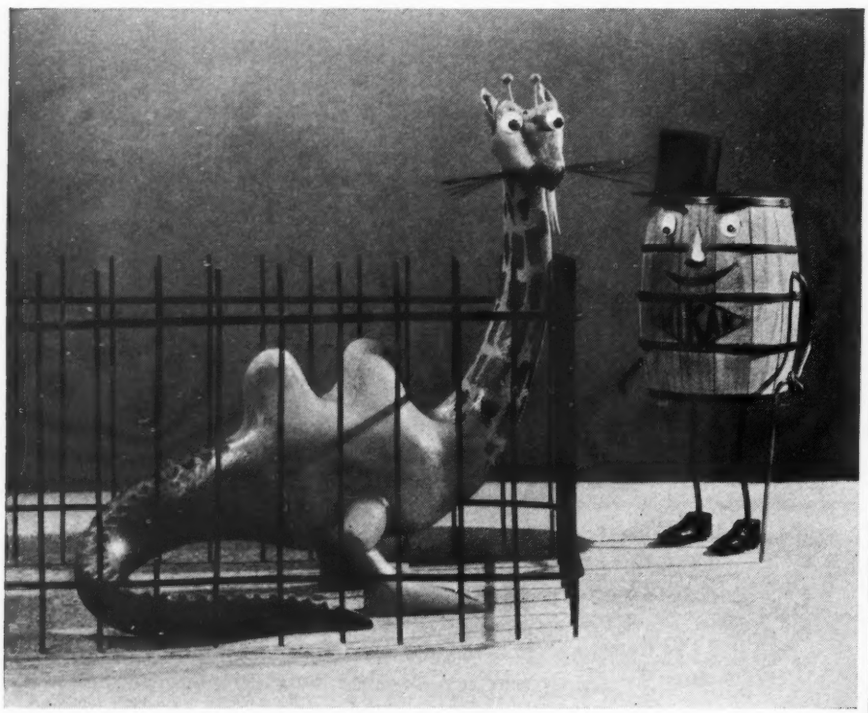
COMMOTION over Supreme Court packing and reform rather obscures substantial progress being made in Congress with respect to other legislation. Few fundamental bills are being enacted, but many understandings are being reached as to what will be passed, with whose support, when finally the Supreme Court battle is out of the way. Congress expects to stay well into the summer, perhaps through August. Most of Washington is not delighted.

» TAXES—Higher tax levies seem inevitable this year. Congress hates to face this fact, but would rather face it now than immediately preceding the 1938 election. Higher levies on individual incomes and on corporations are both forecast.

The national budget daily departs more obviously from balance. Tax realization this year is nearly a half billion dollars less than estimated in the budget message. Expenditures grow, with abundant waste in relief and patronage efforts. Economy talk will produce no material savings. It never does, even on "career" agencies. Politics prevents real economy through alphabetic curtailment.

» MILK REGULATION—The Supreme Court decided March 29 that Virginia could work through a milk commission to create natural market areas, to fix minimum and maximum prices and otherwise to control milk marketing. This appears to give ample basis for federal-state collaboration with respect to any agricultural commodity.

» TRADE COMMISSION—If the Federal Trade Commission by any chance got all the authority proposed for it in numerous pending bills, it would have more authority than Mussolini. No danger of that! But there is an excellent prospect that business will have to play ball under many more FTC rules in the not-distant future.



There's No Such Animal!

The savings you make by buying cheap glue are purely imaginary. The "production headaches" that invariably follow eat up these "paper savings" many times over.

Mikah Glues are made only on a quality basis —for your own protection.

NATIONAL ADHESIVES CORPORATION

New York — Chicago — Philadelphia — Boston — San Francisco and All Principal Cities

» LABOR—In the Supreme Court decisions regarding labor rights under the Wagner Act, there are enough qualifications to restrict and discourage the more optimistic advocates of unlimited Federal operation in labor matters. But the court's findings clearly prove that careful drafting of legislation to assist and protect labor will be more important in the next few months than many other factors, including those given as the real purpose of a law.

Much, if not most, of NRA type of controls may be reestablished if persistent and cautious bill drafting is undertaken. Agricultural legislation seems equally or even more secure. And no one doubts either Wallace's persistence or the care which will be exercised in future bills for farm-production control, even though indirect methods may be necessary.

» LESS MILK USED—The age of distribution of population in the United States is rapidly shifting. There are today many fewer children relative to adults than formerly. Twenty-five years ago, 22 per cent of the population was under ten years of age; now only 17.5 per cent are such youngsters. Already, one expert of the Department of Agriculture states: "The consumption of milk per capita has begun to decline because there are fewer children." Skilled dieticians and milk economists are, therefore, beginning to urge increased campaigns for the use of milk in forms more welcome during the years of youth and adult life.

CONCENTRATES

• To assure effective administration of the Robinson-Patman Act, the Federal Trade Commission has urged Congress to appropriate an additional $300,000 to finance enforcement during the remainder of the fiscal year.

• *The scope of the Walsh-Healey Public Contract Act would be extended under a proposed amendment which would make the act apply to contracts in excess of $2,500, whereas the present limit is $10,000.*

• "Fair-trade" laws prohibiting sales below cost or at unreasonable prices have been adopted by 25 states.

• *Improved business conditions have been reflected in a marked increase in the demand for confectionery, according to Thomas J. Payne, president of National Confectioners' Association of the United States.*

• Sales of beer in bottles or cans continue to increase, amounting now to more than 40 per cent of total consumption as against 25 per cent at the beginning of 1935.

• *Excess stocks of fish are being relieved somewhat through purchases by Federal Commodities Surplus Corp. $1,000,000 was appropriated for this.*

• Full name of the country of origin will be required after May 11 on containers of fruit and vegetable juices shipped into France.

Photograph Racket

Racketeering photographers in various sections of the country have been using the name of FOOD INDUSTRIES or of McGraw-Hill Publishing Co. to obtain permission to photograph important executives. They say the picture is wanted for our editorial files. Their practice is then to return with prints in an attempt to sell the individual a lot of pictures. Neither FOOD INDUSTRIES nor McGraw-Hill Publishing Co. employs such methods.

WHY LO-BAX IS A DEPENDABLE STERILIZER

FOR sterilizing surfaces with which dairy and other food products come in contact, you require a dependable, quick-acting bactericide. Your bactericide must also, of course, be safe, convenient and low in cost.

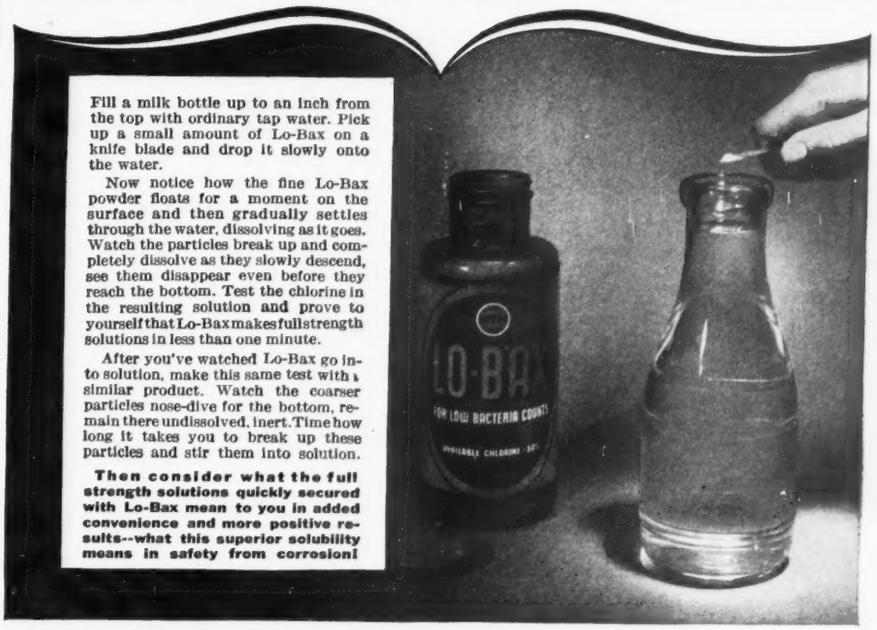
How does Lo-Bax meet *all* these vital requirements?

In the first place, extremely low alkalinity and high chlorine "availability" make Lo-Bax unique among sterilizers for speed and dependability in killing bacteria. The quick solubility of Lo-Bax, moreover, renders positive results doubly sure. For at the end of only one minute, Lo-Bax solutions are up to full strength and ready for use. There are no undissolved, concentrated particles to cause corrosion.

Lo-Bax is easy to use—just add it to water by the spoonful as needed. Lo-Bax is low in cost—one bottle (1¾ lbs.) makes more than 1,000 gallons of clear, 100-p.p.m. bactericidal rinse solution.

Why not let Lo-Bax help you maintain low bacteria counts? Write for full information today.

Make This Test—Prove to yourself that Lo-Bax dissolves faster


Fill a milk bottle up to an inch from the top with ordinary tap water. Pick up a small amount of Lo-Bax on a knife blade and drop it slowly onto the water.
Now notice how the fine Lo-Bax powder floats for a moment on the surface and then gradually settles through the water, dissolving as it goes. Watch the particles break up and completely dissolve as they slowly descend, see them disappear even before they reach the bottom. Test the chlorine in the resulting solution and prove to yourself that Lo-Bax makes full strength solutions in less than one minute.
After you've watched Lo-Bax go into solution, make this same test with a similar product. Watch the coarser particles nose-dive for the bottom, remain there undissolved, inert. Time how long it takes you to break up these particles and stir them into solution.
Then consider what the full strength solutions quickly secured with Lo-Bax mean to you in added convenience and more positive results--what this superior solubility means in safety from corrosion!
LO-BAX
FOR LOW BACTERIA COUNTS

The MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York, N.Y.

Pioneer Manufacturers of Chlorine Products for Nearly Forty Years

MEN, JOBS *and* COMPANIES

Industry

» ARMOUR & Co. will build a packing plant at Knoxville at a cost of $50,000 to $100,000.

» BERCUT RICHARDS CANNERY will make additions to its plant and warehouse at Sacramento, Calif., at a cost of $160,000.

» BORDEN CO. is putting into operation at Dixon, Ill., a new American cheese plant which will have a production capacity of about 10,000,000 lb. annually.

» FROSTED FOODS SALES CORP. early in April opened a plant at Jacksonville, Fla., for freezing Cuban pineapple. Florida strawberries are to be frozen later.

» FRIEND BROS. is spending $75,000 to modernize its plant at Lynn, Mass. Modern slicing and wrapping equipment, new ovens and an air-conditioned proof-box are being installed.

» GRAND UNION TEA CO. is covering 100 new routes in its Chicago territory.

» CHR. HANSEN'S LABORATORY, INC., will erect a modern factory at Little Falls, N. Y. The building will have glass-block windows, ceramic tile interior walls and maple-block floors. Air-conditioning will be used.

» HERSHEY (Pa.) CHOCOLATE CORP. has been upheld in its rights to the trade-mark, "Eatmors" and to the tubular package in which this product is marketed. A decree to this effect was handed down by a federal district court in Pittsburgh.

» HOOD RIVER (ORE.) APPLE GROWERS' ASSOCIATION plans to construct a 500,000- box cold storage warehouse at a cost of $350,000.

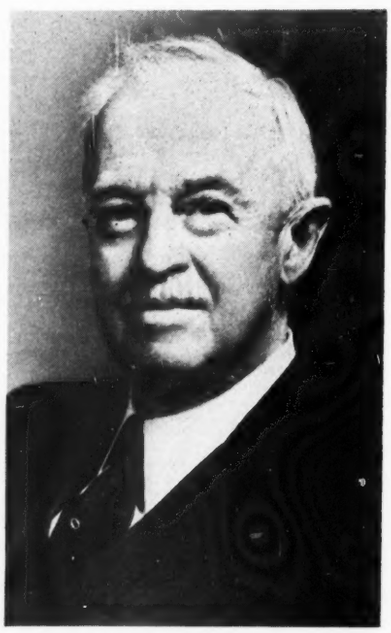
» RICHARD W. KASSE CO., Cleveland, will open seven bakery shops in Manhattan, New York, with an expenditure of $250,000.

» KRAUSE MILLING CO., Milwaukee, suffered damage of $1,000,000 in a dust explosion that killed seven and injured 29 on April 10.

» LOOSE-WILES BISCUIT CO. recently opened offices and warehouses in Salt Lake City.

» OSCAR MAYER CO. is erecting at Madison, Wis., a two-story plant which will cost $111,600.

MILO R. DAUGHTERS
He has been elected president of Natural Food Products Co., Orange, Calif. Mr. Daughters served in the past as research director with Pacific Frosted Foods, Inc., a subsidiary of General Foods Corp., and before that he was in the research department of Continental Can Co. He also has been connected with Dominion Canners, Inc., and Sprague-Sells Corp.



ALVA CUDDEBACK
Fifty years ago he started a successful career in the dairy industry as a milkman on New York's famous Bowery. On April 14, at the age of 73, he retired as vice-president of Sheffield Farms, but he continues as a director. In the late 1880's, Mr. Cuddeback delivered milk to such famous and notorious people as Tony Pastor, Johnny Opp and Suicide McGuirk.

» NATIONAL BISCUIT CO. will spend about $1,000,000 to enlarge its carton plant at Marselles, Ill. The company also is building offices and a new warehouse at Syracuse, N. Y., at a cost of $125,000.

» SHEFFORD CHEESE CO. will open a new plant at Nashville. The plant will supply Southeastern and Southwestern sales territories.

» ST. LOUIS (Mo.) DAIRY CO. is building a $1,000,000 ice cream and milk plant as an addition to present facilities.

» STOKELY BROS. & CO., Indianapolis, has taken over Elba Canning Co., Astico, Wis., and has leased the plant of Wabash (Ind.) Canning Corp. and also a plant in Superior, Wis.

» TOBIN PACKING CO. is erecting, at a cost of $180,000, a new packing house at Estherville, Iowa. The plant will be operated as Estherville Packing Co.

» GEORGE WESTON, LTD., Toronto, and McCormick's, Ltd., London, have merged. The consolidated company is the largest biscuit, candy and bread manufacturer in Canada, and also has interests in the United States.

» WONDER BREAD BAKING CO. plans to spend $50,000 on additions and improvements at Clarksdale, Miss.

» YAKIMA (Wash.) GROWERS' CO-OPERATIVE will construct a new cannery at a cost of $100,000. Various fruits and vegetables will be packed, and operations will begin early in the season.

Personnel

» HARLEY E. ANDRE, vice-president of Armour & Co., recently was transferred to San Francisco in charge of the company's new West Coast offices.

» FRANK M. ARCHER, JR., has succeeded his father, the late Frank M. Archer, Sr., as chairman of the board and general manager of Moxie Co., Boston.

» JOHN C. BRUCKMANN, president and general manager of Consumer's Brewing Co., Newark, Ohio, has assumed the management of Bavarian Brewing Co., Covington, Ky.

» JAMES W. CARKNER has been re-elected president of Loft, Inc., Long Island City, N. Y. A. B. Hoppe was named executive vice-president.

» THEODORE CARL has opened a research and control laboratory with Taylor Wine Co., Hammondsport, N. Y. He formerly was with Standard Brands, Inc., New York, in a technical liaision relation between the research laboratory and the bakery service department.

» ZADOK H. CHEERIX, JR., and Ralph S. Brown, trading as the C & B Canning Co., Snow Hill, Md., have dissolved their partnership. Mr. Brown continues the business under the same trade name.

» WILLIAM H. DUFF, II, president of P. Duff & Sons, Pittsburgh, will represent Associated Grocery Manufacturers of America in the United States Chamber of Commerce.

» R. C. FISHER has resigned as vice-president and general manager of R. F. Worden & Sons, Waterbury, Conn. Mr. Fisher, who is president of International Association of Milk Dealers, was accompanied in his resignation by Judge Theodore V. Meyer, secretary; H. K. Cashin, sales and advertising manager; B. Robb, plant superintendent; M. Young, production manager and F. Malley, night superintendent. Mr. Fisher has not announced a new connection, but Mr. Young has gone with C. E. Smith & Sons, New Haven, and Messrs. Cashin and Robb have formed Cashin's Dairy, Inc., Waterbury.

» DR. S. O. FLADNESS has been appointed chief of the field inspection division of the Bureau of Animal Industry. For the last five years assistant chief of the division, Dr. Fladness succeeds Dr. George W. Pope, retired.

» ARTHUR W. FOSDYKE, formerly in charge of the bakery field service department of Wheat Flour Institute, Chicago, has gone with Midland Flour Milling Co., Kansas City, as general sales representative in the Midwest.

» CHARLES N. FREY, Standard Brands, INC., New York, has been named an official delegate to the Fifth International Technical and Chemical Congress of Agricultural Industries to be held in Scheveningen, the Netherlands, July 12-17. Henry G. Knight, Bureau of Chemistry and Soils, is chairman of the American delegation.

» GAYLORD HANCOCK, superintendent of the Carnation milk plant at Coshocton, Ohio, has been transferred to Galax, Va., to take charge of a Carnation plant now being constructed there. He is succeeded at Coshocton by B. S. Zimmerman, Fort Lupton, Colo.

» T. F. JAMES recently became president and treasurer of Busy Bee Candy Co., St. Louis, having acquired a controlling interest in the concern. John Short, formerly president, was made vice-president and general manager.

» C. F. KIESER is now director of research for Borden Co., New York. He succeeded Dr. Lawrence W. Bass, who left recently to become assistant director of Mellon Institute of Industrial Research.

» DR. JAMES W. KELLOGG has gone with Institute of American Meat Packers, Chicago. He previously was director and chief chemist of Pennsylvania Department of Agriculture.

» F. W. KURK has been made chief bacteriologist and assistant director of research at Wilson & Co., Chicago. Dr. E. H. Harvey has become chief chemist and an assistant director of research.

» STEPHEN LAUFER, director of research of Schwarz Laboratories, Inc., New York, has received the 1936 achievement award presented annually by the Cincinnati district of Master Brewers' Association of America. The

MORE FOOD PLANTS ARE USING

NATIONWIDE OAKITE SERVICE

to help increase efficiency of

Cleaning and Sterilizing Operations

PIPE LINES CLEANED

without dismantling!

You can clean pipe lines without dismantling . . . save time and expense if you follow the simple Oakite method of doing this job. The Oakite materials recommended for this work remove all residues and accumulations. And being free-rinsing, nothing remains on surfaces to impair purity or flavor. Safe to use on all types of piping.

Ask us to send you details of this method.

Wherever foods are handled and processed, a high degree of cleanliness and sanitation of BOTH equipment and plant is a major requirement. That is one reason why more food plants are using Nationwide Oakite Service, because through it, they secure the benefit of 28 years of successful experience that is helping them increase the efficiency of ALL their cleaning and sterilizing operations.

Safeguard Quality at Low Cost!

Maintaining your required sanitary standards the Oakite way safeguards quality because it is dependable, effective, thorough. And you always have the assurance your cleaning and sterilizing operations are being performed economically, efficiently. Let us tell you of the additional advantages available through the use of modern Oakite cleaning and sterilizing materials. No obligation, of course.

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OAKITE

TRADE MARK REG U.S. PAT OFF.

—SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

award signifies outstanding work in brewing technology.

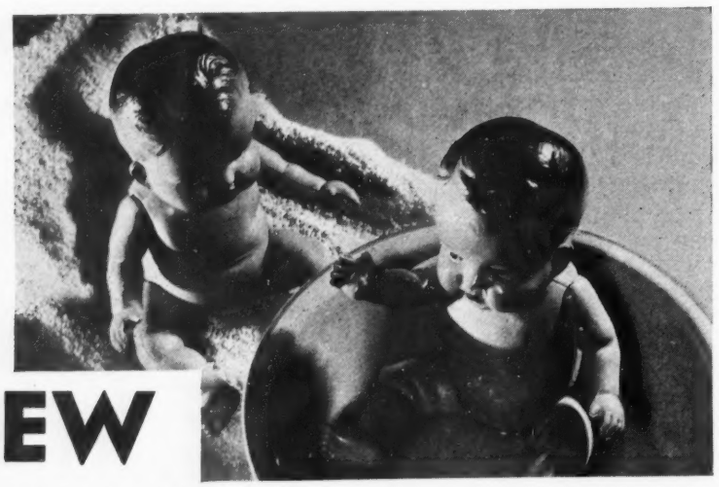
» Dr. Wendell W. Moyer has been named director of research of A. E. Staley Manufacturing Co., Decatur, Ill. He formerly was with Solvay Process Corp., Syracuse, N. Y. In 1930-31, he was a National Research Council Fellow at Munich.

» Robert R. Pierce has been elected treasurer of Cary Maple Sugar Co., St. Johnsbury, Vt. Previously he was office manager.

Martin Schoen has resigned as research chemist of Rockwood & Co., Brooklyn, N. Y.

» Miss E. Singruen became technical editor of *Modern Brewer* on April 12, and she continues as editor of *International Brewing Abstracts,* formerly published by Wahl-Henius Institute, Chicago, and recently taken over by Modern Brewer, Inc., New York.

T. C. Wright has succeeded Fred Atkinson as manager of the Tulsa, Okla., ice cream plant of Swift & Co.



NEW IDEAS are our "babies"

How often do you think, "I wish some one could build a machine to do this job for me"? . . . You have the idea—you know what you want done—you have the "baby."

If it is a packaging idea, lay your "baby" in our lap. Right now we are working on some developments that will mean a great deal to certain manufacturers. And right now *you* can benefit by other ideas that have already been developed into machines which are making striking savings, and are producing outstanding packages.

Are You Still Wrapping by Hand? We have originated many machines for products which at one time were considered too difficult to wrap by machine. Why not see what we can do for you?

Are Your Material Costs Too High? We have made important savings by developing "Electric Eye" machines which use printed material in ***roll form,*** registering the printing perfectly on the package. The saving on the cost of buying "cut-to-size" sheets is considerable.

Have Your Present Machines Become Obsolete? Our new high speed models will give you far greater production for the same labor cost; and they frequently occupy less floor space.

Are You Seeking Package Improvements? We will be glad to give you our suggestions, based on wide experience in serving the leading package goods manufacturers.

Get in touch with our nearest office.

PACKAGE MACHINERY COMPANY, Springfield, Mass.

NEW YORK CHICAGO CLEVELAND LOS ANGELES
Mexico, D. F., Apartado 2303. Melbourne, Australia: Baker Perkins, Pty., Ltd. Peterborough, England: Baker Perkins, Ltd.

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

Deaths

» Frank M. Archer, Sr., 75, chairman of the Board and general manager of Moxie Co., Boston, April 8. Connected with the company for 37 years, he built from a small beginning a business whose product has become nationally known. He was famous for his original and successful advertising methods.

» John C. Beam, 84, superintendent of the cocoa department of Walter Baker & Co., Boston, April 10. He had been with the company 42 years.

» W. Sherman Farrington, 74, vice-president of General Milling Corp., Buffalo, N. Y., recently.

» Frank H. Folsom, 65, vice-president of Daggett Chocolate Co., Boston, March 25.

» Louis F. Greene, 58, treasurer of Bartlett Varney Co., Boston, and for 25 years with Armour & Co., March 24.

» A. R. Hunt, president of David Hunt & Co., which owns Oswego (N. Y.) Preserving Co., March 28. He had been prominent in the canning industry for 30 years.

» Dr. Max Wallerstein, 62, industrial chemist who made many contributions to the technology of brewing, at New York, April 1. He headed Wallerstein Co., Inc., consulting and manufacturing chemists.

» George W. Woodward, 76, founder and retired head of Atlantic Provision Co., Jacksonville, Fla., recently.

Associated Industries

» Armstrong Cork Co. has named Jack Young to succeed A. K. Barnes, director of advertising, who resigned.

» Crown Can Company will build a $3,500,000 plant at St. Louis.

» Foxboro Co., Foxboro, Mass., has appointed C. E. Sullivan, sales manager, to the position of vice-president.

» General Electric Co. has opened at New York an exhibit of electrical products for industry.

» International Harvester Co. has opened a new branch service station in midtown New York. Twenty-four-hour service will be given.

» Owens-Illinois Can Co. contemplates constructing at St. Louis a plant to cost about $500,000.

» Monsanto Chemical Co. has appointed Ed. Schuler manager of the Pacific Coast district office at San Francisco.

» Union Bag & Paper Corp. will construct a new bag factory at Vernon City, Calif.

(*Continued from page 245*)

period the workers' wages rose from $1 to $5 a day, barely enough to cover the increased cost of his milk, bread and rent. Yet during that same period when Santa Claus was making his regular visits to the stockholders, the management of the company bemoaned the efforts of the workers to get them to pay higher wages. They said it was too great a burden on their business and that they could not afford it. Well, every sensible man knows better! When an inventor named Goodyear discovered the process of vulcanizing rubber, it did not mean that the stockholders of a rubber company were entitled to all of the profits of his discovery."

"But, Mr. Lewis, how can your reasoning be applied to an industry where the profits are very slim—almost microscopic?"

"Now you're getting technical and I have no time to go into that."

From the foregoing extremely brief statement of policy, a line of thinking is evident that is not at variance with the few other statements Mr. Lewis has so far made publicly. He is not much given to telling his plans.

That Mr. Lewis' brief statement is an expression of a good social philosophy, none but an extremely narrow mind would deny. Nevertheless, there are many sides to the problem of applying this philosophy which need to be considered. Wages can be raised in many industries and the increased costs can be covered by increased selling prices—sometimes. Yet there are definite ceilings to the prices that consumers will pay. If wage-increases force prices above the ceiling, the market will be greatly diminished for people have pretty definite notions about what they think a thing is worth, e.g., 5 cents for a bottle of pop. Furthermore, wholesale wage increases will definitely increase the cost of living and may create a vicious circle.

For this reason it appears that the Lewis philosophy, though idealistic, possesses the same inherent economic weaknesses as NRA, and AAA. As long as the consumer has the option of buying or not buying, there is no known way to make him pay a price he will not pay.

Industries of the United States are facing a condition and not a theory. Logical reasoning from a sound economic basis is likely to lead nowhere. All industry is facing, particularly since the Supreme Court adjudication of the Wagner Law, a very real problem of human desires augmented by the activities of those who possess the power to play on those desires, arouse wild emotions, influence action and thereby create fairly lucrative jobs for themselves. Collective bargaining is now a definite part of the federal law. It appears likely that the result of the Supreme Court decision will be much greater activity on the part of those who would act as spokesmen for the workers in a plant. And the implication is very clear that the countermove on the part of manage-

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SACCHARIN ... The Ideal Sweetener

VANILLIN ... A Popular Flavor

COUMARIN ... Amplifier for Vanillin

METHYL SALICYLATE
To Impart Wintergreen Flavor and Aroma

PHOSPHATES ... Tri-Sodium, Etc.
Also Phosphoric Acid, Food Grade

SODIUM BENZOATE, U. S. P.
Pure Preservative

•

It will be a pleasure to discuss your present or potential requirements of these and other products made by

Monsanto Chemical Company
St. Louis, U.S.A.

NEW YORK CHICAGO BOSTON BIRMINGHAM CHARLOTTE
CLEVELAND SAN FRANCISCO MONTREAL

CHEMICALS OF QUALITY
Monsanto

* Mr. Lewis is slightly in error on the number of stock dividends which, according to Poor's Manual were as follows:

1902	100 per cent
1909	100 per cent
1910	100 per cent
1912	100 per cent
1914	20 per cent
1916	100 per cent
1920	150 per cent

The 9,600 figure is confirmed, however, on page 3, "The House of Goodyear," by Hugh Allen.

ment should be to keep the channels of communication absolutely clear so that the workers' need for the outside spokesman's services is reduced to zero.

Certain features of the steel agreement, signed on March 17, 1937, are the outcome of years of experience in wage agreements in coal mining and are worthy of anybody's study. These refer to the methods of handling grievances and nearly one-fourth of the entire steel agreement is devoted to this one aspect. On the face of things it looks like a fair arrangement. Whether it will prove satisfactory to employees of the Carnegie-Illinois Steel Corp. in actual practice, will probably depend on the integrity of union officials.

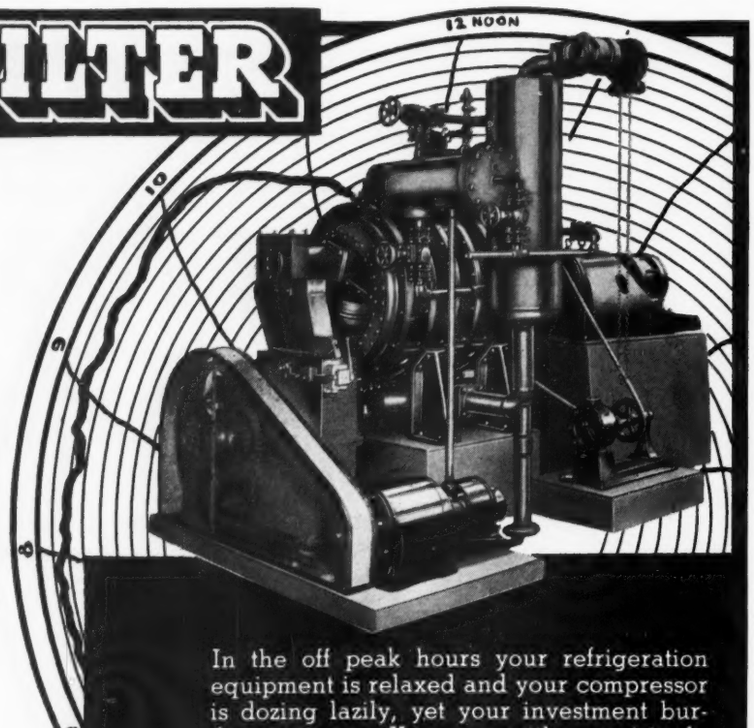
It is regrettable that workers in most industries do not understand the economics of the union movement. Union leaders are in effect heads of political instruments and therefore are subject to all of the vicissitudes of politics. Controversial issues are very important to any political candidate, for without an issue there is no need for an organization. Hence, to hold his job, a union leader must have a periodic turmoil, and each year or so he must demand still more for his constituents, whether he expects to get it or not. He needs an issue. He may even pull a strike to impress the membership of his union with his own power. Cases have been known where such things have been done with the consent of management. In rarer cases it is known that management has requested the union to pull a strike for the purpose of forcing their competitors into line.

In all labor disputes there are always three parties *besides the public:* management, labor and the "labor leader." Some of the latter are trustworthy, sincere men—and then there are other kinds. Probably no field of human activity is so filled with causes for skepticism as to motives or alleged "facts" as in the field of labor strife. Things are seldom what they seem.

And don't think that management is afflicted with all of the jitters afloat these days. The workers themselves are equally susceptible to the jitters. It was noticeable that, when things were popping right and left in the state of Michigan in the motor car industry, there was marked nervousness of all kinds among the workers in other plants all over the country. And should it develop in the future that different types of unions are competing with each other for membership in a given plant, the worker may be subjected to coercion that management never dreamed of.

The times call for calmness and even soothing measures. All supervisory employees should learn to lean over backward to avoid any semblance of friction, and any disciplinary action should be done with the utmost deliberation and fairness. If disciplinary measures must be taken, the workers must be "sold" on the justice in the move.

VILTER



Use Your Compressor In The Off Peak Period To Make Your Own Ice

In the off peak hours your refrigeration equipment is relaxed and your compressor is dozing lazily, yet your investment burden goes on. You can, with surprisingly small additional investment, convert the "off-peak" expense into a profit by installing a Vilter Pakice Machine. Make your own ice for sausage making, top icing, bunker icing or cooling requirements, either in briquette or crystal form. Make as much or as little as you need, when you need it. Saves buying ice — saves crushing expense — saves waste — delivers more efficient protection. Requires little space and no extra labor.

PAKICE is working wonders for others — it will for you, too. Investigate.

THE VILTER MANUFACTURING COMPANY
"SINCE 1867"
2115 South First St.
MILWAUKEE, WISCONSIN
Representatives in Principal Cities

PAK-ICE

Brewers Save

(Continued from page 252)

electric requirements by this turbine and its connected generators. In fact, it may be said that power is now obtained as a byproduct of process steam generation, since the heat extracted from the steam as it expands from 100 lb. to 20 lb. pressure in the turbine is approximately but 2½ per cent of the total heat in the steam as it leaves the boiler.

Food Technologists

(*Continued from page 249*)

packing houses. The practical phases of the other industries are covered equally well.

Arrangements with some of the larger food organizations have presented opportunities for some of our third year men to work during the vacation from June to October and gain practical experience before the senior year. On two occasions parties of ten students have been taken on trips to food industries as far west as Chicago during vacations to widen their food horizons. Regular trips to the many food factories in metropolitan Boston, also to the fisheries at Gloucester are made, and the processes studied.

Laboratory work requires about a third of the scheduled hours over the entire four years. And something like a third of the laboratory time is devoted to the industrial aspects of food technology.

The fourth year work includes the continuation of chemical studies by a long course in biochemistry. The industrial microbiology courses include the laboratory and theoretical study of fermentations, those concerning alcohol, the solvent industries, food fermentations of the acetic and lactic acid types, also yeast culture and the newer industrial mold fermentations.

The senior courses in technology of food products include lecture and laboratory work in canning, freezing, dehydration, baking, fruit juice and jellies, food spoilage and preservation problems, consideration of the legal and health aspects of foods, sanitary problems of food production and waste disposal, packaging and the like. Industrial hygiene and the knowledge of the health hazards of industry as they relate to the safety and efficiency of the worker is another study of this final year.

Here again, the courses in food technology cover both the scientific and the industrial phases of the various subjects. For instance, the laboratory work on canning includes can examinations, grading of canned foods and studies of heat penetration into cans of food.

In the food engineering courses (given by the staff of the Department of Mechanical Engineering), a brief survey of the principles of mechanisms, mechanics, heat engineering, heat transfer and refrigeration precedes a discussion of the unit operations, processes, materials and equipment used in the preparation and handling of foodstuffs. The courses cover canning, packaging and bottling machines, conveyor systems, temperature and humidity control, bakery installations and so forth.

As a culmination of each man's activities, he is required to carry out a thesis, usually one involving considerable laboratory work, on some original investigation. This is under staff supervision, but the student is on his own as far as the actual conduct and completion of the problem is concerned. Not infrequently the solving of such problems paves the way for the first offer of a professional position.

The four-year program is not designed to train technicians, but rather *food technologists*. It is intended to produce technically trained men who see the food industries as a whole—not men who see just the dairy industry or some aspect of it, or the canning industry or the milling industry, and are expert in that to the exclusion of all others. The purpose is to give the students an understand-

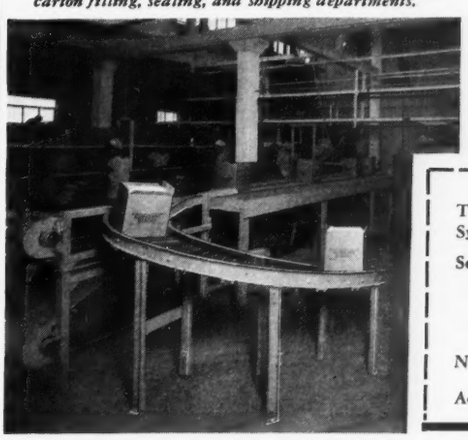
IN many plants, deliveries are slow . . . falling behind orders. Too many "bottlenecks," too many congested points are slowing up the steady flow of goods in process—choking production.

It's unnecessary . . . because "bottlenecks" can frequently be removed by the correct use of Lamson Conveyors.

The specialized knowledge of our engineers is available—without cost or obligation—to help you in removing your production "slow spots". They have all of the latest conveyor equipment necessary to co-ordinate fast automatic machines and workers into a smooth-flowing production system.

Learn all about the latest Lamson Conveyors—gravity, belt, vertical, live roll, slat, drag chain, overhead chain and special types for special uses in food plants. Mail the coupon for a copy of our latest Conveyor Book.

In the Ontario Biscuit plant, Buffalo, N. Y., Lamson Conveyors completely co-ordinate the carton making, carton filling, sealing, and shipping departments.



LAMSON CONVEYORS

The LAMSON Company, Inc.
Syracuse, N. Y.

Send me a FREE copy of your 24 page

☐ Booklet on Lamson Conveyors
☐ Have your engineer call

Name.....

Address.....

ing of the wider aspects of all food procedures which may be applied wherever they may eventually be located. They are not graduate engineers in the common meaning of the term, but they thoroughly appreciate the problems of the engineer.

Perhaps the best criterion of any educational system is the success and usefulness of the men it trains. A relatively small group of men, approximately 50 to date, have been graduated from the M.I.T. food technology course. But from their more than average success in widely varied technical positions, it seems reasonable to assume that there are technical "futures in foods" for men with adequate specialized scientific training.

Trucks in House-to-house Selling

(*Continued from page 257*)

Fresh-baked goods are moved each night from the main plant to each substation in loads of about 8,000 lb. Three trucks of 4 to 5-ton capacity and one new tractor and semi-trailer are used in this work. Since the main plant is not on a rail siding, the same trucks are used to haul supplies.

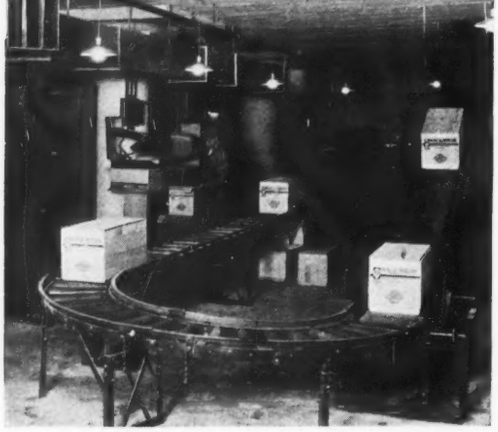
In installing the house-to-house trucks, two truck routes replace three wagon routes and do a somewhat bigger business. Each wagon route averages $150 of sales per week but the truck routes average $250. In the "horse area," truck expense is about 10 per cent of gross sales and wagon expense, 8 per cent. It is this increased truck expense which the Larsen company is attempting to reduce.

On both trucks and wagons, the drivers are paid at the rate of 20 per cent of their route sales. Already, some reduction has been made by closer control on maintenance and use of truck governors and oil filters.

Further savings are anticipated by replacing with tractors and semi-trailers the conventional trucks used in main-plant-to-substation haulage. Additional sales per route and lower unit costs are being sought by hiring one canvasser-inspector for each eight routes.

MODERN FOOD PRODUCTION DEMANDS

Continuous Flow



FOOD consumption is the most stable and continuous human activity. Therefore, food production is the most logical field for continuous flow principles. Yet historically continuous flow was first developed in the highly seasonal canning industry in order to attain maximum output in limited time.

Continuous flow materials handling reduces obstinate costs, simplifies production, improves processing and permits most efficient use of plant facilities in every food product field. From incoming bulk raw materials through all the various processing operations to the packaging, casing and shipping, Mathews system based upon Continuous Flow Principles make production one unified, integrated whole.

With a Mathews system there are no bottlenecks, no confusion, no delays. Storage and warehousing are reduced, products reach consumers in shortest time.

Continuous flow production is most flexible and most adaptable to modern distribution requirements.

A Mathews survey by a competent field engineer will show how to make fullest use of continuous flow with slight change in present methods and generally, relatively slight investment.

"Problems Solved with Mathews Conveyer Systems" is a book which illustrates many typical examples of the Continuous Flow Principle. Write for it today.

MATHEWS

CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

CONVEYERS

MATHEWS CONVEYER COMPANY
116 TENTH STREET
ELLWOOD CITY, PENNA.

Diastatic Malt Extract

(*Continued from page 255*)

day shows a total as follows:

188 bushels malt @ $1.70 per bushel..	$317.60
Water	5.37
Miscellaneous electric power	3.00
Labor—40 man-hours @ 50 cents per hour	20.00
Supervision @ $1 per hour	8.00
Fixed charges to cover cost of equipment	9.00
Miscellaneous expense, supplies	4.00
Total	$366.97

The unit cost per pound of this extract is $0.063. Should the plant be operated upon a three-shift basis, there would be a worth-while reduction in the cost per pound of extract.

In calculating the cost per pound of this extract, advantage is taken of the savings given by using a cooling tower for the condenser water. It must be remembered that the capital investment for a cooling tower installation is about one-sixth that of the total plant equipment. This expense may be avoided if the plant is situated where river water suitable for use in the condenser is available.

The table gives a comparison of total plant cost with and without the cooling tower. These plants are laid out on the basis of making 500 gal. of 80 per cent total solids diastatic malt per eight-hour day. They may be operated on a 1, 2 or 3-shift basis to produce 500 gal., 1,000 gal., or 1,500 gal., respectively, of 120 diastatic power malt.

(*Continued from page 266*)

and potassium salts also act as accelerators but their effective concentration is higher, about 0.1 per cent or more being needed.

MISCELLANEOUS

Vitamin P

VITAMIN P is the tentative name for a substance which has a marked and somewhat specific influence on the capillary system of animals. Experimental scurvy is perhaps a deficiency disease caused by a combined lack of Vitamins C and P. Vitamin P seems to be identical with "Citrin", the crystallized flavone fraction of lemon juice. On a scurvy diet rats lived longer, lost less weight and suffered fewer internal hemorrhages when they received Vitamin P daily than without it.

Digest from "Vitamin Nature of Flavones," by A. Bentsath, St. Rusznyak, and A. Szent-Gyorgyi. *Nature*, 138, 798, 1936. (Published in England)

MEAT PRODUCTS

Drying Whale Meat

THE MEAT OF MARINE ANIMALS such as whales and seals is prepared for the drying operation by being cooked a quarter or half-hour in open batch cookers or under steam pressure in continuous rotary digesters. The water and the oil which are liberated are drained off and the meat is disintegrated, either mechanically or by sudden release of the pressure in a pressure cooker. As the invention is disclosed in British Patent 449,499 (granted Sept. 17, 1936 to B. R. Bostock and Southern Whaling and Sealing Co., Ltd.), the meat is cooked in slices up to an inch thick, and for open cooking either fresh or sea water may be used. For pressure steam-cooking the preferred pressure is about 40 lb. per sq.in. After the meat is drained and disintegrated, it is pressed to remove such water and oil as it still retains. It is then shredded to the desired fineness and dried.

Salts for Curing Meat

PREPARATIONS OF MEAT-CURING SALTS containing both sodium nitrite and sodium nitrate are made from a solution or a melt of the components. Two preferred methods of preparation are disclosed in British Patents 455,816 and 455,823 (both granted Jan. 21, 1937 to Griffith Laboratories, Inc.). One is to deposit the nitrite and nitrate on salt (sodium chloride) crystals by spraying or otherwise applying a strong brine of sodium nitrite and sodium nitrate on crystals of sodium chloride which are so hot that they not only evaporate the water from the film of solution surrounding each crystal, but also fuse the residue of nitrite and nitrate firmly to the hot crystals. Cooling should be rapid and with agitation, e.g., by dropping the crystals in a tower.

The other preferred method is to effect firm physical union of the sodium nitrite with the sodium nitrate (or of potassium nitrite with potassium nitrate) by fusing the salts together. No carrier crystals of sodium chloride are used, but a little (up to 5 per cent) may be added to the melt. To obtain the desired properties it is important that all parts of the mixture should cool and solidify at the same time, so rapid cooling of the melt is necessary. This may be accomplished by spraying or by spreading the melt in a thin film on a cold surface. Meat-curing salts prepared as described may be used either as dry curing salts (rubbed on the surface of the meat) or in pickling brines.

In one plant we know it cost only .0018 of a CENT per BARREL to eliminate this costly pest

This flour producer has overcome his losses from insect infestation by fumigating his plant with LIQUID HCN four times a year. When this 2500-barrel mill operates at capacity for 200 days a year, the annual cost is only 18/100 cent per barrel—an insignificant expenditure to effect great savings.

Another food company, producing prepared cake and flour mixtures, uses HCN in its vacuum chamber fumigation. The chamber is loaded with 40,000 pounds of the packaged product at a time.

In this plant a complete kill of all insects and their larvae is obtained at a cost of 15/1000 cent per pound of packaged product.

Neither of these two companies has sustained losses from insect infestation nor have there been returns on insect-infested products.

If you handle flour, rice, raisins, dates, figs, nuts, cacao or other food products subject to insect infestation, why not write us for an estimate of the cost of obtaining a complete kill of destructive pests.

LIQUID HCN is an all-purpose pest destroyer. It is a powerful, concentrated, economical and efficient fumigant, completely controls all insects which infest stored products, and kills rats and mice.

As the only manufacturer of HCN in all its modern forms – including LIQUID HCN (commercially pure), ZYKLON DISCOIDS and CYANOGAS – American Cyanamid is in position to render a complete and valuable service.

AMERICAN CYANAMID & CHEMICAL CORPORATION

Insecticide Department

30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

KANSAS CITY MO. AZUSA, CALIF.

Freezing Poultry

(*Continued from page 247*)

tion would be greatly handicapped and the freezing expense greatly increased. For these economic reasons, the freezing on the brine line is carried to the point that the fowl is fully frozen internally but with the exterior still slightly pliable. After the fowl has been in the hardening room sufficiently long for it to become fully solidified and dry, it is removed to the 32 deg. F. packing room where it is given a quality grading and the protruding ends of the paper tube are pushed in flush with the exterior of the fowl to seal the tube against easy passage of air and prevent drying out of the fowl.

The fowl is then dipped momentarily into clear drinkable water for the formation of a surface glaze preliminary to packaging in a non-moisture-proof Sylphrap bag. This bag is folded about the fowl to make a compact, easily packed package for storage or shipment in one dozen lots in a corrugated board container. In its finished form the fowl has a final weight of from 1 to 2 oz. less than its plucked but undrawn weight and a bloom which is characteristic of freshly killed high grade poultry. This bloom, as well as the fresh poultry flavor, is retained through long storage periods as long as the fowl is not exposed to air currents or to thawing temperatures.

Fowls frozen by the "Cridericed" process are graded "A," "B," and "C" according to freedom from broken or blistered skin defects, shape, correctness of bleeding, cleanness of plucking, and plumpness. The chickens frozen in the Chambersburg plant run through the range of broilers, fryers, roasters, and stewers. They are processed at the rate of 300 fowls per ten-hour day on two twelve-outlet units. Estimates for higher production facilities give an output of 6,000 fowls per eight-hour day on a 420 outlet installation in a 32x40 ft. room held at a working temperature of 32 deg. F.

In the course of freezing, packing, and storing of "Cridericed" poultry in the Chambersburg plant at the rate of 30 fowls per hour the 3.5-ton refrigerating demands are more than met by a standard 5x5 in. Frick unit with a single stage ammonia compressor rated at 4.78 tons. This compressor supplies three thermostatically regulated cooling systems through electrical control valves which automatically open and close to permit or to prevent the flow of liquid ammonia into each or all of the systems to give the temperature desired at that location by direct expansion.

One of these systems keeps the hardening and storage room at 0 deg. F. by means of ceiling and wall coils. A second system holds the processing and packing room at 32 deg. F. by means of ceiling coils. The third system supplies refrigeration to a cabinet type, zigzag coil and trough cooler which holds the processing brine in the temperature range of —3 to —5 deg. F. (Fig. 1).

By operating the processing, packing and storage areas within these definite temperature ranges special refrigerating equipment and brine pipe insulation are unnecessary and, what is most important, the poultry is processed and handled under conditions which make for the retention of the natural good qualities of freshly killed poultry and for low processing costs.

PATENTS

Low-Acid Cream Containing More Than 65 Per Cent Butter Fat Prepared From Sour Milk or Cream—Herman D. Wendt, West Chester, Pa., to Milk Processes, Inc., of Philadelphia, Pa. No. 2,072,192. March 2, 1937.

Dried Figs Treated to Lighten Color, to Retard Crystallization of Sugar on Surface, and to Provide Sterilization for Packaging—Carl F. Love, to California Prune and Apricot Growers Association, San Jose, Calif. No. 2,072,309. March 2, 1937.

Green Apples Put Into Dry Powdered Form at a Temperature not Exceeding 50 Deg. C.—Erich Kretschmer to Krouse Medico Gesellschaft mit beschränkter Haftung, Munich, Germany. No. 2,072,402. March 2, 1937.

Animal Intestines Processed for Use as Sausage Skins by Mechanical Means—Thomas Augustus Darrington, Smithfield Market, England. No. 2,072,443. March 2, 1937.

Acid Content of Citrus Fruits Fully Recovered in Manufacture of Citrate of Lime—Andrea Ricevuto, Palermo and Alexander Hutcheon Bennett, Messina, Italy. No. 2,072,530. March 2, 1937.

Starch Separated From Corn Gluten Material by Flotation Operations With Re-Use in Steeping Operation of Water Recovered From Starch Milk—Robert Edman Greenfield and Harold R. Baker to A. E. Staley Manufacturing Co., Decatur, Ill. No. 2,072,633. March 2, 1937.

Sugar Syrup Decolorized Through Use of Hydrogen Peroxide in the Manufacture of Refined Sugar—Hans O. Kauffmann, to Buffalo Electrochemical Co., Inc., Buffalo, N. Y. No. 2,072,639. March 2, 1937.

Smoked Meats Given a Cellulose Covering Followed by a Coating of Gelatine and Finally Wrapped or Covered With a Moistureproof Coating—Charles T. Walter, to Industrial Patents Corp., Chicago, Ill. No. 2,072,660. March 2, 1937.

Hot Bread Cooled to Slicing and Packaging Temperatures Within 15 to 30 Minutes by Use of a Vacuum Maintained at a Point Above the Vapor-Pressure of Water at the Crust Temperature—Montague H. Duval, Great Neck, N. Y. No. 2,072,737. March 2, 1937.

Baker-Yeast Made From Beer-Yeast—Edmund Fuchs, Miha'ovce, Czecho-slovakia. No. 2,072,748. March 2, 1937.

Rolls and Pastries Given a Split Top Decoration by Forming a Series of Incisions Radiating From the Mid-Section of the Dough to Points Short of the Outer Edge—Patrick J. Brennan, one-half to Edward Fox Baking Co., Inc., York, Pa. No. 2,072,793. March 2, 1937 and No. 2,075,699. March 30, 1937.

Concentrated Maple Flavoring Obtained From Crystalline Maple Sugar by Means of Steam Condensate—Albert A. Lund, New York, N. Y. No. 2,072,895. March 9, 1937.

Acidification of Milk by Citric Acid Aids in Lowering of Calcium and Phosphate Ion Content—Herbert E. Otting, Westerville, and Edwin H. Browne, Columbus, Ohio, to M. & R. Dietetic Laboratories, Inc. No. 2,072,903. March 9, 1937.

Carbohydrate Residue Removed by Yeast Fermentation With Aid of a Soluble Calcium Catalyst in the Course of Citric Acid Production by Mold Fermentation—Justin Zender, Ardsley, N. Y., to Stauffer Chemical Co., New York, N. Y. No. 2,072,919. March 9, 1937.

Oil or Water Constituents Removed From Solid Materials in an Automatic and Continuous Manner by a Horizontal Hydraulic Press—Fred S. Carver, Short Hills, N. J. No. 2,072,942. March 9, 1937.

Papain-Containing Materials Used Domestically for Partially Pre-digesting Meat and Similar Foods to Make Them Tender—William Richard Flodden Lunt, Durban, Natal, Union of South Africa. No. 2,072,955. March 9, 1937.

Artichokes Canned Under Vacuum—Herbert E. Gray and Arvid M. Erickson, San Jose, Calif. No. 2,073,006. March 9, 1937.

Bakery Products Cooled During Passage Through Compartment Counter-current to Flow of Temperature and Humidity Regulated Air—Wade W. Reece and Louis W. Haas, to W. E. Long Co., Chicago, Ill. No. 2,073,221. March 9, 1937.

Whole Dried Beans Processed in Cans to Give a "Baked" Product Without Breaking up of Beans or Swelling of Can—Edward C. Eberts, Indianapolis, Ind. No. 2,073,339. March 9, 1937.

Whole Tomatoes Packed and Processed Without Mushing—Edward C. Eberts, Indianapolis, Ind. No. 2,073,340. March 9, 1937.

Egg Whites Thinned to Desired Consistency By Action of Proteolytic Enzymes—Arnold K. Balls, Washington, D. C. and Theodore L. Swenson, Chevy Chase, Md. to the Public of the United States of America. No. 2,073,411. March 9, 1937.

Ice Cream Cone With Conical Shaped Stem and Rectangular Shaped Top End Having Flat Bottom—Jane Balton, Baltimore, Md. one-fourth to Joseph Shapiro, Baltimore, Md., One-fourth to Isaac Shapiro, Chicago, Ill., one-fourth to Nathan Shapiro and one-fourth to Samuel Shapiro of Chelsea, Mass. No. 2,073,440. March 9, 1937.

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Grains Dried Under Vacuum With Application of Heat—Karl Dienst, Hildesheim, Germany. No. 2,073,553. March 9, 1937.

Macaroni Ingredient Premixing Attachment for Continuous Operating Paste Preparing Units—Giustino Sicarra, Isernia, Italy. No. 2,073,567. March 9, 1937.

Foods For a Complete Meal Hermetically Packaged in a Compartmented Tray Type Container—Edward Holoubek, Roy, Mont. No. 2,073,635. March 16, 1937.

Foods For a Complete Meal Hermetically Packaged in a Compartmented Can—Edward Holoubek, Roy, Mont. No. 2,073,636. March 16, 1937.

The Frozen Pack Food Industry

Sources, Processing, Distribution, Utilization and Market Data Concerning Frozen Fruits, Vegetables

Digest from a Market Survey
of
THE UNIVERSITY OF TENNESSEE
Agricultural Experiment Station
Knoxville, Tennessee

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SURVEY MADE BY HARRY CARLTON, MARKET INVESTIGATOR,
SUBMITTED TO C. A. MOOERS, DIRECTOR, OCTOBER 15, 1936

The Frozen Pack Food Industry

WITHOUT frozen pack fruits, all jams, jellies and other preserves had to be manufactured during the fresh fruit season, or else must be made from canned fruits. Frozen packing of fruits provides a supply of fresh fruit over the entire year. It also permits the location of preserving plants near their markets, rather than in the fresh fruit growing districts.

Advantages obtained from the use of frozen pack fruit in preserving include avoiding operating and labor congestion during the fresh fruit season and reduction of plant overload through continuous operation. It also allows the preserver to offer a continuous supply of freshly made preserves, and to gage production more nearly to demand.

Ice cream makers and pie bakers soon found that frozen pack fruits enabled them to supply fresh fruit products through all the year. They also found that fruit packed in this way was ready for use, and that with it they could avoid all cleaning, grading and other preparatory operations.

In addition, cold pack fruit is generally of good quality. Many processors consider it superior to the fruit available on the fresh fruit market, especially when they are located at such long distances from the growing areas that they find difficulty in obtaining strictly fresh fruits.

Also, because of mass preparation and packing, standardized quality, carload lot transportation, and elimination of spoilage in transit, the ultimate cost of frozen pack fruit is probably less than the average cost of fruit purchased in the fresh fruit market.

These same advantages apply to foods such as fruits, vegetables, meat and fish frozen for the institutional and retail markets.

Classification of Frozen Packs

The utilization of frozen pack products divides into three general classes:

A—Raw materials for processing into other products.

B—Products for the institutional trade, including hotels, restaurants, shops, dining cars, hospitals and other institutions.

C—Products for home consumption, that is, for sale at retail to consumers.

Four general types of frozen packs are now being produced:

1. BARREL PACK. This is mostly in 50-gal. barrels, with small quantities in 30-gal. barrels and in kegs. This pack goes largely to preservers and ice cream manufacturers.

2. BULK PACK. This is a general term applied to fruits frozen without sugar in various sizes and types of containers. There are three general types of this pack: crates of berries and other fruits, practically all used by pie bakers; single frozen foods, such as berries and peas, where each single unit is frozen separately before packing, while on a belt or other appliance; and, finally, 30-lb. wooden lugs of blueberries frozen in Canada and imported for use by pie bakers.

3. INTERMEDIATE OR TIN PACK. This is mostly in 30-lb. tin cans, with some in smaller cans, down to 2½ lb. capacity. Fiber and paper containers are also being used for the smaller sizes of this pack. This pack is mostly for the institutional trade, for small processors, and for pie bakers. Small quantities of this pack are used by ice cream manufacturers and preservers.

4. RETAIL PACK. This is packed in small containers, generally of 1 lb. or less in size. Paper cartons, cups, tins and various other containers are used.

Table I—Frozen Pack Fruit Production, Washington and Oregon, 1935.

Variety	450-lb. BBl.	30-lb. tins	1-lb. cartons	Total in lb.
Strawberries	52,526	65,210	945,712	27,610,891
Red Raspberries	21,046	20,823	15,432	8,972,298
Loganberries	5,271	3,810	792	2,608,043
Blackberries	11,843	9,423	660	5,290,560
Black Raspberries	2,726	1,918	.....	1,107,294
Youngberries	261	1,152	60	149,940
Gooseberries	430	10	.....	138,430
Currants	1,271	130	.....	480,525
Rhubarb	.....	1,025	.....	26,650
Prunes	148	3,236	.....	204,938
Damson Plums	3	.....	.....	1,050
Royal Ann Cherries	628	.....	.....	270,040
Red Sour Cherries	1,586	48,779	.....	2,423,663
Black Cherries	7	.....	.....	3,010
Grapes	92	.....	.....	31,845
Huckleberries	.....	158	.....	37,657
Sliced apples	.....	500	.....	15,000
Apricots	116	65	.....	58,640
Peaches	55	14	.....	47,062
Total	98,009	156,253	862,656	49,462,536

Table II—Eastern Output of Frozen Pack Fruits, 1935

Variety	Pounds
Barrel Pack Strawberries	11,700,000
Crate Frozen Strawberries	3,600,000
Red Sour Cherries	15,000,000
Blueberries (Maine pack)	600,000
Peaches	1,300,000
Wild Blackberries (Kentucky)	400,000
Total	32,600,000

Table III—Output of Frozen Pack Strawberries in Eastern United States, 1935.

Variety	Origin	450-lb. bbl.	30-lb. tins
Missionary	Florida, North Carolina, Virginia, Maryland, Delaware	16,895	5,300
Klondike	Louisiana, Alabama, Tennessee	3,833	3,475
Blakemore	North Carolina, Virginia, Maryland	2,145	2,050
Premier	Mostly in New York	875	750
Gibson	Mostly in New York	800	.....
Total		24,548	11,575

Frozen Fruit Packing Methods

Methods of cold packing strawberries, typical of barrel pack methods for fruit, were described by R. T. Shannon before the 1934 Convention of the International Association of Ice Cream Manufacturers, and in FOOD INDUSTRIES, February, 1935. The essentials are:

1. Berries must be of a variety suitable for freezing and for utilization in the market.

2. Berries should ripen in the fields beyond the point when they are usually picked for the fresh market.

3. Packing should be carried out near the growing fields, promptly after the berries are packed.

4. Berries must be thoroughly washed, graded as to size, sorted for foreign matter and all spoiled or imperfect fruit must be removed.

5. Berries should be thoroughly mixed with and coated with sugar when placed in the containers. Sugar should be allowed to melt completely before containers are placed in the freezing room.

6. The period between packing and freezing should not be long. Indications are that the shorter this period, the better is the color, flavor, and texture of the product.

7. Freezing at 0 deg. F. for 48 to 73 hours, and storage at 12 to 15 deg. F. seems to result in a pack which best meets trade preferences.

Before freezing, the barrels are left on their sides, and given a half turn and rocked frequently to insure complete melting of the sugar and mixing of sugar and fruit. Barrels are also given a half turn at least four times each day during freezing and should be turned several times during the first month of storage.

Another method of packing strawberries in barrels is to slice the berries before freezing. This is said to give a firmer and better colored fruit, of better flavor. This pack is popular with ice cream makers using continuous freezers.

Crate frozen strawberries are packed only in the East, and are used mostly by pie bakers. Generally, this pack is frozen just as purchased on the fresh fruit market, without capping or sorting.

"Single frozen" or "bulk" pack fruits are frozen before packing in the containers, while the fruit rests on belts or trays. The fruit is then packed mainly in 32 lb. plain or corrugated fiber shipping cases with waxed paper liners. Some packers use an ordinary light canner's case, but most prefer something a little heavier, or with a fiber liner to add rigidity. The size of this pack in 1935 has been reported as follows:

Strawberries	24,000 lb.
Red Raspberries	44,352 lb.
Blackberries	305,875 lb.
Loganberries	472,373 lb.
Black Raspberries	6,600 lb.
Gooseberries	800 lb.
Huckleberries	13,077 lb.
Miscellaneous	9,220 lb.
Total	876,297 lb.

Most "single frozen" fruits are used in the pie baking industry.

Frozen Vegetable Packing Methods

Vegetables are frozen either dry or in brine. When packed dry, each piece (as each individual pea or bean) is dipped in, or sprayed with, water, then frozen with sufficient rapidity to form a thin ice glaze about it. Next the vegetable is filled into containers, and is then ready for shipment. In the brine system, the vegetables are filled into the containers, and then brine is added. Then the whole is frozen, so that the vegetables are in a solid block with the brine.

Fruit Sugar Ratios

Barrel and tin packs of frozen fruits are usually made up of part sugar and part fruit. Such a pack is usually referred to as 2/1, 3/1, etc. This means 2 lb. of fruit to 1 lb. of sugar, 3 lb. of fruit to 1 lb. of sugar, and so on. The amount of sugar going into a frozen pack depends upon the preferences of the market for which the pack is destined and the length of time that the pack is to be kept in storage before use.

One opinion on the relation of sugar content to keeping quality is as follows: When stored at 15 deg. F., the keeping qualities of various fruit-sugar mixes are:

1/1	indefinitely
2/1	2 to 3 years
3/1	3 months
4/1	4 months

Strawberries. The proportions of the frozen strawberry pack made with various fruit-sugar ratios are:

Barrel Pack Strawberries

2/1	66.5 per cent
3/1	17.5 per cent
4/1	11.5 per cent
1½/1	1.1 per cent

30-lb. Tin Pack Strawberries

2/1	1.2 per cent
3/1	50.0 per cent
4/1	32.5 per cent
5/1	12.0 per cent

Preservers and ice cream makers prefer the 2/1 pack as they believe it retains more nearly the flavor, color and texture of the fresh berry. Experiments made by the Massachusetts Experiment Station and others bear out this opinion. Many leading ice cream manufacturers buy the 2/1 pack, as the fruit does not freeze as hard and the mixture is less acid than when less sugar is used. The preference of the 30 lb. tin users for less sugar may be accounted for by the fact that the tin pack is sold at higher prices than the barrel pack, mostly to small users. They object to paying 10 to 15 cents per lb. for any more sugar than is absolutely necessary. So they strike a balance between cost and quality, and favor the 3/1 pack.

Red Raspberries. Fruit sugar ratios found in the 22,601 barrels of red raspberries investigated were as follows:

No sugar	82 per cent
3/1	17.2 per cent
4/1	0.6 per cent
2/1	none

The red raspberry is well adapted for packing without sugar. Some Eastern preserve manufacturers specify the no sugar pack for use within three to six months, while they use the 3/1 pack for longer storage periods.

Blackberries. All tame blackberries, frozen in barrels, are packed without sugar. The tin pack is 3/1. Kentucky wild blackberries are packed 2/1, 3/1 or 4/1, as specified by the buyer at the time of the pack.

Peaches. Frozen pack peaches in barrels show 94 per cent with a fruit sugar ratio of 3/1, with the rest packed 2/1 and 4/1. The pack in 30 lb. tins is usually 3/1. Some pie bakers prefer 4/1 and 5/1. Ice cream makers prefer 3/1. The California pack for preserve manufacture was 2/1.

Cherries. Almost the entire production of frozen pack cherries is made with a fruit sugar ratio of 4/1. The small remainder is either 3/1 or 5/1.

Blueberries. Imported frozen pack blueberries are frozen without sugar. In Maine, a 5/1 pack is used.

Northwestern Production of Frozen Pack Fruits

Frozen pack fruit operations in the United States find their center in the states of Oregon and Washington. There, soil and climatic conditions are ideal for growing many fruits, particularly berries. But the region is far from the main consuming centers of the Northeast. The success of these states in building up a profitable growing in-

Table IV—Comparison of Average Prices Paid Growers and Open Prices for Frozen Pack Northwest Fruits, Years 1932, 1933, 1934, 1935

Fruit	Pack	Average Price Paid to Grower Cents per lb.	Opening Price Cold Pack Cents per lb.	Spread over Cost of Fruit Cents per lb.
Strawberry	2/1	4	6.5	3.84
Strawberry	No sugar	4	6.69	2.69
Red Raspberry	" "	4.75	6.87	2.12
Blackberry	" "	2	4.12	2.12
Loganberry	" "	2.37	4.81	2.44
Youngberry	" "	4	6.5	2.50

Table V—Cold Storage Rates—Frozen Pack Fruits—Carload Lots

	50-gal. barrels (Rates per barrel)				Tins (Rates per 100 lb.)			
	Received fresh to freeze		Received frozen		Received fresh to freeze		Received frozen	
Location	First month	Subsequent months	First month	Subsequent months	First month	Subsequent months	First month	Subsequent months
Pittsburgh, Pa.	.85	.50	.70	.50	.25	.12½	.20	.12½
Cincinnati, Ohio	.....	.....	.75	.50	.40	.15	.25	.15
Philadelphia, Pa.	.60	.35	.50	.35	.....	.....	.27	.17
Rochester, N. Y.	1.13	.36	.65	.35	.25	.08	.20	.08
New York, N. Y.	1.26	.81	.60	.45	.28	.18	.23	.18
Baltimore, Md.	.....	.....	.60	.40	.....	.....	.18	.12
Buffalo, N. Y.	.....	.....	1.00	.50	.....	.....	.....	.....
Cleveland, Ohio	.60	.35	.50	.35	.25	.15	.20	.15
Detroit, Mich.	.....	.....	1.13	.50	.25	.12½	.20	.12½
Chicago, Ill.	.....	.....	.50	.40	.22½	.10	.18	.10
Indianapolis, Ind.	.90	.50	.....	.50	.20	.12½	.15	.12½
St. Louis, Mo.	.60	.40	.55	.40	.....	.....	.....	.....
Nashville, Tenn.	1.75	1.00	.....	.....	.50	.20	.....	.20
Chattanooga, Tenn.	1.75	1.00	.....	.....	.....	.....	.....	.....
Memphis, Tenn.	1.00	.75	.....	.....	.....	.....	.....	.....

dustry was first tied to the development of a canning industry, and more lately has been extended through the packing of frozen fruits and vegetables.

The first cold pack experiments are credited to H. S. Baker, Sr., in 1908, in Denver, Colo. Three years later, in cooperation with local people in Puyallup, Wash., a commercial pack of berries was produced and distributed. In 1912, Baker started packing at Tampa, Fla., following the fruit season to Hammond, La., to Dayton, Tenn., then to Norfolk, Va., and finally to Michigan. This routine was followed until 1917, since when these operations were confined to the Northwest.

Growers, packers, the United States Department of Agriculture, and the State Colleges of Oregon and Washington cooperated in developing the best methods of packing and freezing to meet trade preferences. The Northwest berry pack is now the standard by which frozen packs are judged in the markets of the Northeast. The region is now packing seventeen different fruits commercially, and five other fruits have been packed experimentally. Total production for recent years follows:

Year	Pounds*
1920	3,200,000
1921	1,200,000
1922	4,000,000
1923	6,000,000
1924	10,000,000
1925	12,000,000
1926	25,564,000
1927	32,456,152
1928	58,883,604
1929	41,674,513
1930	46,731,514
1931	52,462,600
1932	42,732,376
1933	36,377,767
1934	41,307,933
1935	49,462,536

*1920–1926, estimated; 1927–1935 actual

The 1935 frozen fruit pack in Oregon and Washington breaks down in accordance with Table 1, based on reports of *Western Canner & Packer.*

Eastern Production of Frozen Pack Fruits

In contrast to those of the Northwest, frozen pack operations in the East, except for the red sour cherry pack, have been unorganized, unstandardized, and unrecorded. Table II gives estimates of the University of Tennessee for frozen pack fruit, representing an average for 1934 and 1935.

Small local packs of red raspberries, blackberries and other small fruits, as well as of frozen apple slices, are not included in the table, as their total is insignificant.

Eastern frozen pack strawberries are not generally considered by users to be equal to the Northwestern pack. This arises from the fact that the Eastern growers often consider this pack mainly as an outlet for fruit that is not salable in the fresh fruit market, and consequently do not take adequate care in preparation and processing. The Eastern frozen pack strawberry output, by variety, point of origin, and container type is estimated as in Table III.

Cost of Frozen Pack Fruit Operations

No data could be obtained giving the exact cost of the cold packing of fruit. The best indication is Table IV, based on the cost of the fruit, and price of pack.

Freezing and Storage Charges for Frozen Pack Fruits

Most of the freezing and cold storage of frozen pack fruits is done on a custom basis by cold storage and custom freezing companies (see Table V).

In the East, charges for freezing and the first month of storage range from 60 cents in St. Louis, Cleveland and Philadelphia, to $1.75 in Chattanooga and Nashville, per 50 gal. barrel. Holding charges per barrel per month for

Table VI—Net Weights of Frozen Fruits Packed in Barrels and Tins*

Net Weights of 50-Gal. (450-lb.) Barrels*

Item	Straight	5xl	4xl	3xl	2xl
Strawberries	380	...	400	420	450
Raspberries, red	380	...	400	420	450
Raspberries, black	380	...	400	420	450
Blackberries	390	...	400	430	...
Loganberries	380	...	400	420	450
Gooseberries	300	...	...	...	...
Cherries, r.s.p.	...	420	450	450	...
Currants, red	375	...	...	...	...
Currants, black, stemmed	330	...	...	...	...
Prunes, pitted	...	...	420	...	...
Prunes, not pitted	350	...	...	...	...
Apricots, pitted	...	...	...	450	450
Rhubarb	...	...	350	375	...
Huckleberries	325	...	...	...	...
Peaches, pitted	...	...	...	...	450

Net Weights of Tins*

Item	Pack	30-lb. tins	10-lb. tins
Strawberries	3xl	30	10
Raspberries, red	3xl	30	10
	Straight	30	10
Raspberries, black	3xl	30	10
	Straight	28	9
Blackberries	3xl	30	10
Loganberries	3xl	30	10
	Straight	28	9
Gooseberries	Straight	18	..
Cherries, r.s.p.	3xl	30	10
Currants, red, stemmed	3xl	30	10
	Straight	30	10
Currants, cleaned, not stemmed	Straight	25	9
Currants, black	Straight	24	8
Prunes, pitted, Italian	4xl	30	10
Apricots, pitted	3xl	..	..
Rhubarb, cut 1 inch	4xl	26	8
Huckleberries	5xl	30	10
	Straight	27	8

* From *Western Canner & Packer* — 1935 Statistical Review Number. Weights are in pounds.

Table VII—Freight Rates on Frozen Pack Fruits

Berries or fruit, in water or in their own juice, or sugared, when chilled or frozen for preservation in transit, in metal cans, crated, or in bulk in barrels, or in triple wall waterproof inner containers packed in fiber boxes complying with Rule 41 of current Western Classification, C. L. minimum weight, 46,000 lb.

C. L. minimum weight, 30,000 lb.

Strawberries, (frozen or not frozen), sugared for preservation, in bulk in barrels, carloads, minimum weight, 36,000 lb.

To	From Seattle, Washington Rate*	Refrigeration charges per car	From Chattanooga, Tennessee Rate*	Refrigeration charges per car	From Nashville, Tennessee Rate*	Refrigeration charges per car	From Dyersburg, Tennessee Rate*	Refrigeration charges per car
Chicago, Ill.	105	$90.00	94	$60.00	76	$57.50	38½	$57.50
Cleveland, Ohio	105	100.00	93	60.00	84	65.00	57	65.00
Detroit, Mich.	105	100.00	95	65.00	86	70.00	55½	70.00
Boston, Mass.	105	110.00	117	80.00	126	80.00	81½	80.00
New York, N. Y.	105	105.00	108	72.50	117	72.50	78	72.50
Philadelphia, Pa.	105	105.00	103	72.50	112	72.50	74	72.50
Baltimore, Md.	105	105.00	99	72.50	108	72.50	72	72.50
Terre Haute, Ind.	105	95.00	82	60.00	64	57.50	....	.....

* Rates in cents per 100 pounds.

Tariff authorities: H. G. Toll, 3-I, ICC 1356; R. A. Travillion, 148–0, ICC 8042: R. A. Sperry, 15-B, ICC 304: B. T. Jones, 450-C, ICC 2849; R. C. Dearborn,8, ICC 7.

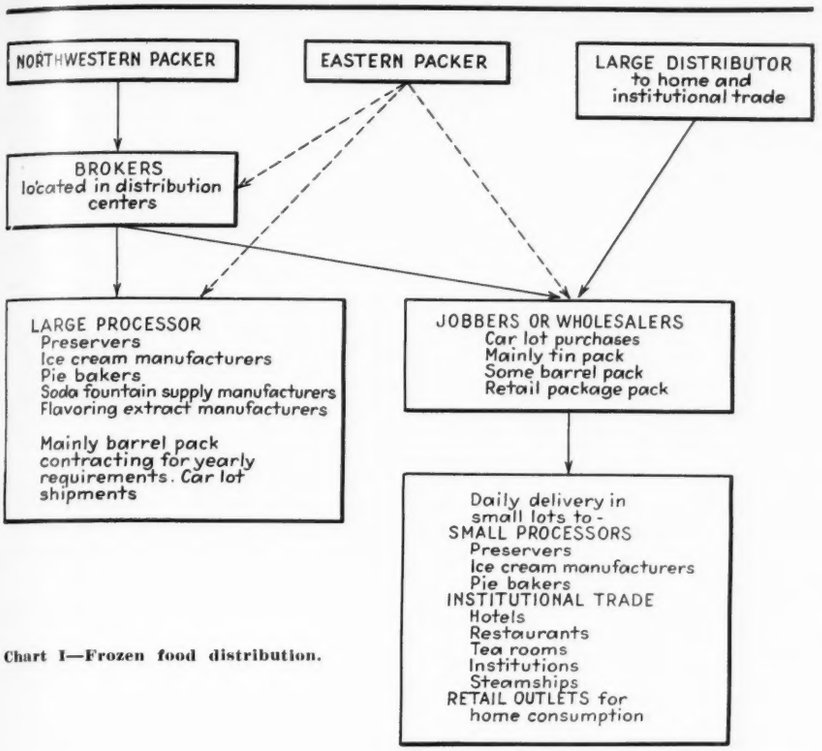


Chart I—Frozen food distribution.

subsequent months range from 35 cents in Philadelphia to $1 in Chattanooga and Nashville.

In the Northwest, charges for freezing and the first month of storage range from $1.25 to $1.50, with a charge of 30 cents per month thereafter.

Frozen Vegetable Production

All vegetables do not freeze equally well. And there is a great variation in the adaptability of different varieties of the same product or the same variety raised in different localities. Celery, cabbage and lettuce present difficulties and are not produced in commercial frozen pack.

Northwestern frozen pack vegetable output in 1935 (Western Canner & Packer, 1936 Yearbook) was estimated as follows:

Peas	3,500,000 lb.
Spinach	100,000 lb.
Beans, green and lima	1,000,000 lb.
Asparagus	500,000 lb.
Other vegetables	2,500,000 lb.

Frozen Pack Containers

Containers used for packing frozen foods include various types and sizes of wooden barrels, tins, wooden crates and boxes, paper and fiber cartons, and paper cups, boxes and other packages.

Quantity packs for preservers and ice cream manufacturers employ 50 gal. barrels. A smaller number of 30 gal. (270 lb.) barrels are packed for the larger ice cream manufacturers in small cities, who find the larger barrel too big and the 30 lb. tin too small for their needs. Specifications of the Northwest Fruit Barrelers Association state: "It (the barrel) shall be new, six hoop, paraffine lined, and made of fir or other suitable wood."

The 30 lb. tin is next in importance as to the poundage packed in it. Fifteen and 10 lb. tins are also used in smaller numbers. These tins are round cans with slip covers, enameled for fruit and plain for vegetables. Use of the No. 10 can is increasing in the Northwest. This can holds about 7½ lb. and has a friction top. A few 50 lb. tins and 1, 2 and 5 gal. cans are used in the Northwest, but their use is decreasing.

"Single frozen" or "bulk" berry packs in the Northwest usually employ 32 lb. plain or corrugated fiber shipping containers, with waxed paper liners.

Crate frozen berries for pie makers are frozen in standard berry crates.

Vegetables for the institutional trade are packed in No. 10 cans, or 5, 8 and 10 lb. friction top tins.

"Quick frozen" foods of all kinds, for retail and institutional consumers, use paper containers. One large packer used cartons 5x3x2 in., holding from 10 to 14 oz., and 10x5x2 in. cartons, holding 2 to 3 lb. Paraffined paper containers for packing frozen foods are available in various sizes holding from 1 lb. to 1 gal.

Statistical information concerning the production and distribution of frozen foods in small containers has never been gathered. The best information available is derived from the shipment records of container manufacturers. One manufacturer of tin containers reported shipments in 1935 as follows:

Destination	Number and Size	Probable Use
New York State	101,000–30 lb.	Mostly for cherries, with an estimated 5 to 10 per cent for strawberries.
New York State	20,000–10 lb.	
New York State	5,000–15 lb.	
Maine	7,000–30 lb.	Blueberries
New Jersey	200,000–10 lb.	Peas
New Jersey	200,000–2½ lb.	Peas
Maryland	15,000–10 lb.	Vegetables
Maryland	115,000– 5 lb.	Vegetables
New Jersey and North Carolina	200,000–12 oz.	Green Asparagus

The manufacturer reported a trend toward lithographed tops or bodies as the only method of labeling the containers which would withstand frost and moisture.

The same company estimated its Midwest container deliveries for frozen pack as twice the quantities in the table. It also estimated that it sold containers for a total frozen pack of 9,600,000 lb.

Another container manufacturer reported the following sales for 1935:

Destination	Number and Size	Probable Use
New York and Pennsylvania	150,000–30 lb. 10,000–15 lb. 35,000–10 lb.	Presumably Cherries
Virginia	75,000–30 lb.	Apples
Michigan	20,000–30 lb.	Apples
Virginia	10,000–30 lb.	Peaches
Alabama, Louisiana and Florida	200,000–30 lb.	Strawberries

Transportation of Frozen Pack Foods

About 80 per cent of the frozen pack foods from the Northwest are sent to market in refrigerator cars, with the remaining 20 per cent moving by refrigerated steamships. The freight rate by mail is $1.05 per hundred pounds to Chicago and points east, with a refrigeration charge varying from $75 to $95 per car. An additional charge for salting increases the refrigeration charge to an average total of about $100 per car.

For barrel shipments, 8 to 12 per cent salt is used, and for smaller containers 13 to 16 per cent salt. The salting fee is 20 per cent of the refrigeration cost for barrels and 30 per cent for smaller containers.

Carload minimum weight from the West Coast to Chicago and east is 46,000 lb. The total transportation cost per pound ranges from 1.3 cent to Chicago to 1.5 cent to East Coast cities. See tables VI and VII.

The rate by boat is 90 cents per hundred pounds with no additional refrigeration charge. However, Seattle is the only port which has this service regularly to the East, and the present capacity is limited to about 100 tons every two weeks.

At the present time there is no uniform freight rate for frozen foods from points in the South to points in the consuming area of the Northeast.

Silica gel cars are coming into use for the transportation of frozen foods.

Operating on the absorption refrigeration principle, these cars provide cross-country transportation with a temperature variation during the trip of not more than 2 deg. F., plus or minus. With ice refrigeration delivered temperatures were reported as 18 to 20 deg. F.

Refrigerated trucks are used for short hauls on smaller quantities, with satisfactory results.

Suitable containers are available for using dry ice as a refrigerant for small lot shipments.

Distribution of Frozen Pack Fruits

Frozen pack fruits are distributed through three general outlets:

1. Direct sales as raw materials to processors, mainly preservers, ice cream manufacturers and pie bakers.
2. Wholesale to small processors and the institutional trade, including hotels, restaurants, ships, dining cars, hospitals and other institutions.
3. Retail through regular distribution channels to homes.

In Chart I are shown the channels of distribution employed by Northwestern and Eastern packers and by a large distributor of foods frozen for the retail trade. The distribution of this latter distributor differs from that of other frozen food packers in that it has its own sales organizations in various consuming centers, which perform the functions of the broker. Specializing in small containers packed for the retail and institutional trades, it rarely sells to even small processors.

Northwestern packers follow a consistent and effective method of distribution. They have established connections with leading food brokers in important centers of frozen pack consumption. These brokers are, in effect, the packers' sales representatives. They work on a commission of 4 to 5 per cent on all sales, bearing their own sales expense. This arrangement gives the packer all the advantages of his own district sales offices in buying centers at a predetermined percentage cost that is not payable until the sale has been made and the payment has been received. If a packer can supply all a broker's requirements, that broker may represent that packer exclusively. Otherwise, a broker may represent several packers. All sales in the territory allotted to a broker are handled through him.

Most large buyers prefer this procedure. It gives them a local and responsible contact with the packer. It facilitates purchase negotiations, the placing of rush orders, tracing of shipments and adjusting of complaints. It keeps them in touch with market and production conditions.

Packers find that this arrangement permits them to gage the market at all times. A capable broker can give the packer estimates of probable sales in his district, enabling the packer to estimate the size of various packs needed. Contracts are usually made with the large processors for their year's requirements well before packing commences. Packers can also usually depend upon their brokers for the disposal of any excess stock.

Brokers fill less than carlot orders by dividing a car among several customers. They arrange for storage and distribution of shipments. In cases of complaints, the broker looks out for the packers' interests. Brokers also arrange, through jobbers and wholesalers, to reach the smaller users. (As far as the packer is concerned, there is no distinct dividing line between the services of jobber and wholesaler.)

Eastern packers of frozen foods generally follow no established distribution channels, but sell through any or all. This encourages cut-throat competition which works against the stability of the Eastern frozen pack industry. Also, there are some Eastern packers who make no plant investment, but pack when and where there are surplus fruits available at low prices. This is another disturbing factor.

Table VIII—Location of Processors Who Purchase Barrel Pack Frozen Fruits, By Cities

Location	Number of Processors	Number using 400 or more barrels per year	Number using 100 to 399 barrels per year
Louisville, Ky	3	1	1
St. Louis, Mo	5	3	0
Indianapolis, Ind	3	1	0
Chicago, Ill	10	7	3
Detroit, Mich	2	1	1
Cleveland, Ohio	9	5	1
Cincinnati, Ohio	6	2	1
Pittsburgh, Pa	7	2	2
Southwestern N. Y.	1	1	0
Buffalo, N. Y.	1	0	1
Rochester, N. Y.	4	2	0
Central N. Y. State	4	0	0
Boston, Mass.	10	4	6
New York, N. Y.	13	10	2
Philadelphia, Pa.	7	5	1
Baltimore, Md.	4	2	2
Washington, D. C.	3	0	1
Richmond, Va.	1	0	1
Total	93	46	23

Table IX—Frozen Pack Fruit Consumption in the United States 1935

Fruits	Thousands of Pounds
Strawberries	42,910
Red Sour Cherries	16,000
Red Raspberries	8,972
Blackberries	5,690
Blueberries*	5,100
Loganberries	2,608
Peaches	1,300
Black Raspberries	1,107
Miscellaneous	1,500
Total	84,577

*4,500,000 lb. of the total of 5,100,000 lb. of blueberries reported were packed in Canada and Newfoundland.

Markets for Frozen Pack Fruit

Outlets for 450-lb. barrels of frozen fruits in Eastern markets are shown in Table VIII. Table IX shows total frozen fruit consumption. Markets by varieties are as follows:

Strawberries. Sources of supply of the various varieties of frozen pack strawberries, and their distribution in the market, are illustrated in Map I, as well as by Table X. Data on the map include 48,145 barrels of Marshalls grown in the Northwest, with a fairly uniform distribution; 16,895 barrels of Missionaries from the Middle Atlantic States, North Carolina, Virginia and Maryland, distributed generally in the Northeast, but mostly in New York and Rochester, with secondary consumption in Boston, Philadelphia, and Pittsburgh; 3,833 barrels of Klondikes, mostly from Louisiana and Tennessee, distributed mostly to St. Louis, Mo., with secondary distribution in Cincinnati, New York and Boston; 2,146 barrels of Blakemores from North Carolina, Virginia and Maryland, going

Table X—Important Markets for Frozen Pack Strawberries

Location	Barrel Pack lb.	Tin Pack lb.	Crate Pack lb.	Total lb.
Louisville, Ky	236,250	.....	.....	236,250
St. Louis, Mo	2,083,500	.....	18,000	2,101,500
Indianapolis, Ind. and vicinity	937,350	30,000	14,400	981,750
Chicago, Ill	3,361,500	227,450	923,400	4,312,350
Detroit, Mich	270,000	345,000	234,000	849,000
Cleveland, Ohio	3,026,250	30,000	.....	3,326,250
Cincinnati, Ohio	774,000	60,000	.....	834,000
Pittsburgh, Pa	1,604,250	82,500	18,000	1,704,750
Southwestern N.Y.	1,350,000	.....	.....	1,350,000
Buffalo, N. Y.	45,000	73,500	.....	118,500
Rochester, N. Y.	2,061,000	30,000	.....	2,091,000
Central N. Y. State	58,500	37,500	.....	96,000
Boston, Mass.	2,322,000	189,000	.....	2,511,000
New York, N. Y.	8,478,000	372,000	831,600	9,681,600
Philadelphia, Pa	4,567,500	90,000	.....	4,657,500
Baltimore, Md.	1,338,750	75,000	.....	1,413,750
Washington, D. C.	135,000	60,000	.....	195,000
Richmond, Va.	63,000	.....	.....	.....
Total	32,711,850	1,501,950	2,039,400	36,253,200

Note: Practically all barrel pack strawberries are used for processing: 81.5 per cent by preservers, 12 per cent by ice cream manufacturers, 5 per cent by pie bakers. Small quantities are used for fruit juice and flavoring extracts. The pie baker is an important user of 30-lb tins, taking about 60 per cent. Most of the crate pack is used by pie bakers.

mostly to Pittsburgh, with a secondary market in Boston. Table X also shows 1,675 barrels of Gibsons and Premiers. These were raised and processed in New York State.

The 30-lb. tin pack of frozen strawberries follows the same general distribution channels as the barreled fruit. The crate pack is wholly of Eastern berries, of undetermined varieties. It goes to the distribution points indicated in Table X.

Many preserve manufacturers regard the Northwestern pack of Marshall strawberries as the only one suitable for their purposes. However, others are less positive, and some positively prefer the other varieties. Missionaries are used by preservers in Pittsburgh, Rochester, Boston and New York, and by ice cream makers in Boston, Baltimore and Philadelphia. Preserve makers in Baltimore use Marshalls exclusively. In Philadelphia, a center of use for Missionary strawberries in ice cream, this variety is little used by preservers. Klondikes are used for preserves mainly in St. Louis and Cincinnati, but also to some extent in New York and Boston. Their main use in ice cream is in Boston; for pies, in Chicago. While Blakemores are only used to any extent for ice cream making in Boston, the preserve manufacturers of Pittsburgh, Cincinnati, Fredonia, Boston and New York use them.

Red Raspberries. All of the frozen pack of red raspberries that was investigated originated in the Northwest, except 18 barrels. The total was 22,601 barrels, and the origin and distribution of this fruit are as shown by Map II and Table XI. Preserve makers used 22,465 barrels of this fruit, and ice cream makers used 136 barrels. Fruit packed without sugar made up 18,550 barrels of the total.

The 30-lb. tin pack of red raspberries in the Northwest in 1935 equalled 20,823, while 3,488 tins containing 15 lb. and 2,294 tins containing 10 lb. were packed there in the same year. The total pack in that year in the Northwest was 8,972,298 lb., about 32 per cent of the Northwest strawberry pack, but only 23 per cent of the total strawberry pack.

Hotels, restaurants and other institutions took most of the tin pack of red raspberries. These users employed the fruit in making pies, ice cream and sherbets. Some of the pack of this fruit is pureed, to supply ice cream and sherbet makers with fruit from which the seeds have been removed.

Blackberries. Map III and Table XII show the origin and distribution of 5,421 barrels of frozen pack blackberries from the Northwest (Evergreens) and 1,050 barrels of wild blackberries packed in Kentucky. All of the wild fruit was used by Cincinnati preserve manufacturers. New York and Philadelphia were found to be the most important markets for the Northwest frozen pack tame blackberries.

Blackberries frozen-packed in 30-lb. tins are distributed to the institutional trade for pies, ice cream and desserts. Blackberries are the third most important frozen pack berry, and, in 1935, equaled in size 19 per cent of Northwest frozen strawberry pack.

Recently, Northwest packers of frozen fruit have shipped some youngberries, a berry thought to be a variety of blackberry. In 1935, 149,940 lb. were frozen, in 261 barrels, 1,552 tins of 30-lb. capacity and 60 cartons of 1-lb. weight. These all went to pie bakers and preserve manufacturers. This berry is not yet in demand, but its smaller and softer seeds cause some users to believe that it may make a good substitute for ordinary blackberries.

Peaches. Except for 47,062 lb. of peaches reported as frozen in the Northwest in 1935, and 70,000 lb. of California peaches frozen in the same year, all of the frozen peaches were packed in the East as shown in Table

Map I—Sources of supply of various varieties of frozen pack strawberries, and their distribution in the market.

XIII. These peaches, with the exception of 50 barrels, were all Georgia peaches, but the freezing was all done outside of that state, mostly by users at the point of use.

Most of the barreled frozen peaches investigated were used for ice cream making. Except for the 70,000 lb. of California peaches already mentioned, which were used by a preserve manufacturer, and some tin pack used by pie bakers, ice cream flavoring is the only present processing outlet for any size of container frozen for this fruit.

Most frozen peaches are packed in barrels, the total for this container being from 3,000 to 4,000 barrels per year. Other containers used for small parts of the output are the 30-lb. tin and the 1-gal. vacuum packed can.

Cherries. Frozen pack cherries are divided into three classes: red sour; Royal Ann (white sweet); and black (black sweet). The Northwestern pack of 270,000 lb. of Royal Ann and 3,000 lb. of black, in 1935, were the only packs of these two types reported.

Red sour cherries are mainly packed in the Northeast. The frozen pack of this fruit reported by Michigan State College for 1934 was:

New York	10,400,000 lb.
Michigan	1,600,000 lb.
Wisconsin	2,600,000 lb.
Ohio and Penn	400,000 lb.
Total	15,000,000 lb.

The Northwest is estimated to have had a frozen pack output of 1,000,000 lb. in 1934 and reported 2,423,663 lb. in 1935.

Distribution of this fruit was determined as follows:

Pie bakers	87.5 per cent
Preserve manufacturers	11.5
Ice cream makers	1.0

Most of the cherries are frozen in 50-gal. barrels. Other containers used are 30-lb. and small tins.

Apples. Data on the frozen pack of apples is incomplete, both as to quality and market. Apples are cold packed in New York, Pennsylvania, Virginia and Michigan. All the frozen pack apples reported are packed in 30-lb. tins and are sold to pie bakers. Peeled, sliced and frozen, ready for use in pies, this pack is another indication of the food manufacturers' desire to keep preparation operations out of his plants.

The chief obstacle to frozen packing of apples is oxidation and consequent discoloration. Packers who handle this fruit have secret formulas for avoiding discoloration. It is understood that washing in mild salt brine, or the addition of small quantities of such acids as citric acid, are the usual bases of these formulas.

Blueberries. Aside from 600,000 lb. of frozen pack Maine blueberries, all of this fruit reported came from Canada and Newfoundland. Map IV and Table XIV show the origin and distribution of frozen pack blueberries from foreign sources.

The Canada importations are packed in thin wooden boxes called "lugs," each holding 30 lb. These berries are packed dry, without sugar, and frozen in the lug. Berries packed in this way, after being stored for nearly a year, were in excellent condition and were apparently

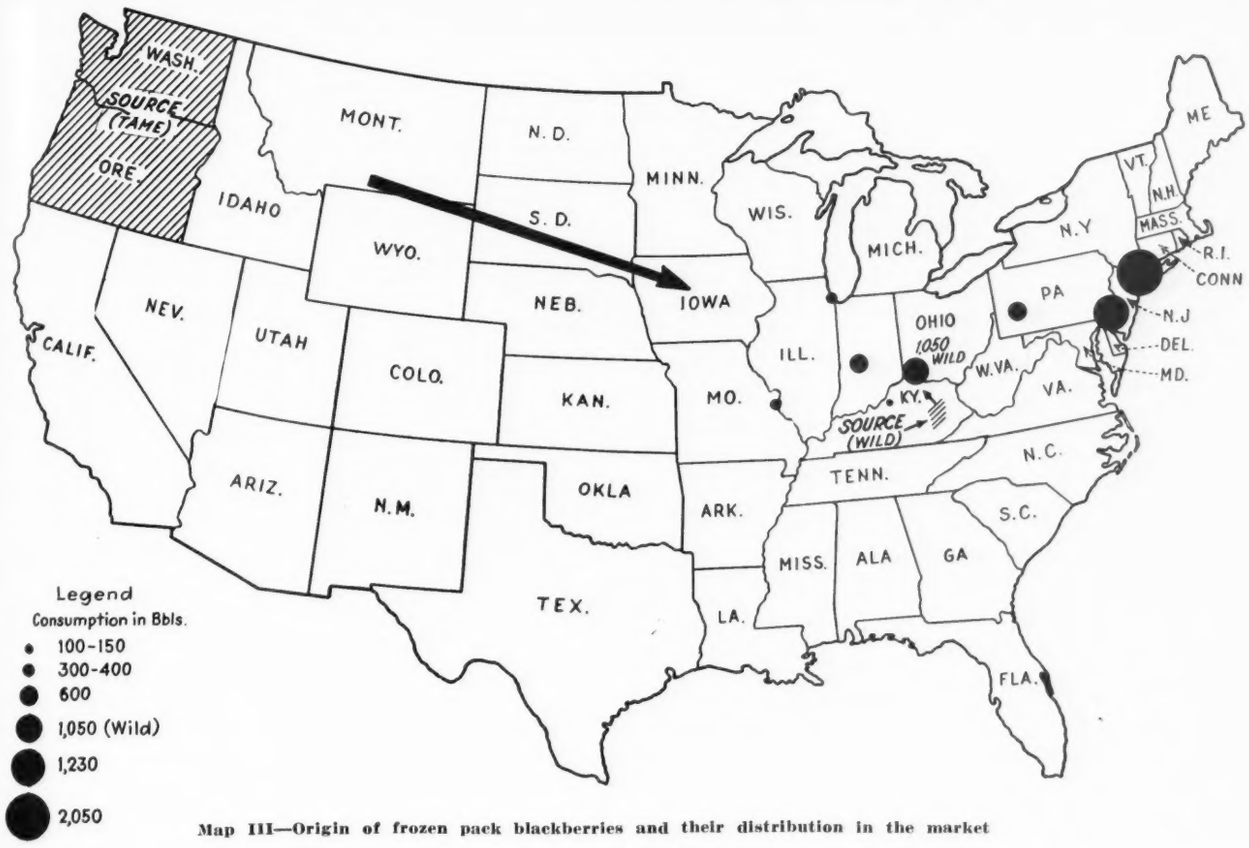
Table XI—Location of Consumption and Use of Frozen Pack Red Raspberries Packed in 385-lb. barrels.

Location	Total barrels	Preserves	Ice cream
Louisville, Ky.	50	50	...
St. Louis, Mo.	655	650	5
Indianapolis, Ind. and vicinity	2,500	2,500	...
Chicago, Ill.	2,860	2,850	10
Cleveland, Ohio	3,430	3,425	5
Cincinnati, Ohio	225	225	...
Pittsburgh, Pa.	800	800	...
Rochester, N. Y.	225	225	...
Boston, Mass.	2,678	2,670	8
New York, N. Y.	6,765	6,750	15
Philadelphia, Pa.	1,645	1,570	75
Baltimore, Md.	750	750	...
Washington, D. C.	18	.....	18
	22,601	22,465	136

Note: All were Cuthberts from Northwest, except the eighteen barrels of eastern pack located in Washington, D. C.

Type of pack — Fruit/sugar ratio
No Sugar — 18,550 bbls.
2/1 — 28 "
3/1 3,883 "
4/1 — 140 "

Map II—Origin of frozen pack red raspberries and their distribution in the market



Map III—Origin of frozen pack blackberries and their distribution in the market

Table XII—Location of Consumption and Use of Frozen Pack Blackberries Packed in 385-lb. barrels

Location	Total barrels	Preserves	Variety	Source	Fruit/sugar ratio
Louisville, Ky.	146	146	Evergreen	Northwest	No sugar
St. Louis, Mo.	400	400	Evergreen	Northwest	No sugar
Indianapois, Ind., and vicinity	600	600	Evergreen	Northwest	No sugar
Chicago, Ill.	325	325	Evergreen	Northwest	No sugar
Cincinnati, Ohio	1,050	1,050	Wild	Kentucky	2/1, 3/1, 4/1
Pittsburgh, Pa.	600	600	Evergreen	Northwest	No sugar
Boston, Mass.	100	100	Evergreen	Northwest	No sugar
New York, N. Y.	2,050	2,050	Evergreen	Northwest	No sugar
Philadelphia, Pa.	1,230	1,230	Evergreen	Northwest	No sugar (note)

Notes: All cold-pack blackberries located were consumed by preserving industry. Includes 30 bbls. of " Black Diamonds " packed in East. No sugar.

equal to fresh fruit in color, texture and flavor. No domestic berries are packed by this method.

All of this fruit is used by pie bakers, except for a small quantity which is made into prepared pie filling by preserve manufacturers.

In addition to the frozen blueberries pack, a small quantity of frozen wild "huckleberries" is reported from the Northwest. These were frozen in bulk, in boxes, without sugar. The quantity reported was 116,215 lb. in 1933, 90,000 lb. in 1934, and 37,657 lb. in 1935.

All blueberries that are frozen are the wild berries. The cultivated berry is not considered suitable by pie bakers, as it is said to lack the desired color and flavor.

How the Preserver Uses Frozen Pack Fruits

Preserve manufacture is the most important outlet for frozen strawberries, red raspberries and blackberries. Of 101,795 barrels of these fruits that were traced to their destination for 1935, the preservers used 90 per cent, as follows:

Variety	Total Barrels	Barrels Used by Preservers	Per Cent Used by Preservers
Strawberries ...	72,693	63,620	87.5
Red Raspberries	22,601	22,465	99.0
Blackberries ...	6,501	6,501	100.0
Total	101,795	92,586	90.0

Large preserve manufacturing plants are located in or near large consuming centers as shown in Table XV. The West Coast manufactures preserves mainly for its own use, shipping out only about 20 per cent of its output. With the exception of one plant in Minneapolis, all important preserving plants are located either on, or east of the Mississippi. The relative importance of leading consuming centers as markets for strawberries, red raspberries and blackberries that are to be used in the manufacture of preserves is shown in Table XV.

The only information available covering the production of preserves by varieties is the 1930 survey of the industry made by the Foodstuffs Division, Bureau of Foreign and Domestic Commerce, at the request of the National Preservers Association. This survey indicates that preserves and jams constitute 50 per cent of the entire production of the preserve industry; jellies, 27 per cent; fruit butters, 20 per cent; and citrus marmalade, 2.5 per cent. Approximately 75 per cent of all these products are packed in glass, 13 per cent in tin, and 12 per cent in other containers. The relative position of the four leading varieties of jams and jellies using frozen packed fruits is:

Variety	Per Cent of Total Preserves	Per Cent of Total Jellies
Strawberry	37.81	4.5
Raspberry	17.76	13.0
Peach	8.55	....
Blackberry	6.27	2.9

How the Ice Cream Manufacturer Uses Frozen Pack Fruits

Ice cream makers are the third largest users of frozen pack fruits. Of the fruits traced by this survey, they used 12 per cent of the total barrel pack of strawberries, all of the peaches, and a small part of the red raspberries.

Ice cream production, by sections, in the United States is approximately as follows:

North Atlantic States...	42 per cent
Central Eastern States..	24 per cent
Southern States.....	13 per cent
Midwestern States.....	10.5 per cent
Western States.....	10.5 per cent

This shows that ice cream production is largely concentrated in the section where the consumption of frozen pack foods is also concentrated.

Flavor popularity analyses for ice cream, see Table XVI, show vanilla to be first in public favor, with chocolate next, and strawberry third. Strawberry ice cream averages about 8.25 per cent of all ice cream sales.

How the Pie Baker Uses Frozen Pack Fruits

While the pie baking industry is a poor third in the use of barrel frozen strawberries, using less than 1 per cent, it takes about 60 per cent of the tin pack and all of the crate frozen berries. Another 20 per cent of the tin pack goes to the institutional trade, where it is used mostly for pie baking. Some additional barrel pack is used for pies indirectly in the form of pie filler manufactured by preservers. The survey reported more than 1,000,000 lb. of barrel and tin pack strawberries used for pies. Add to this the 3,600,000 lb. of crate frozen berries. An indicated use of about 5,000,000 lb. of frozen strawberries for pies was apparent.

Cold pack fruit appeals to all classes of pie bakers. It offers them fresh fruit for their pies both in and out of season, and is a standardized, high quality product ready prepared for use. This latter factor is becoming increasingly important, as it takes out of the factories and kitchens various space-taking and time-consuming operations.

The most popular cold pack fruit in the pie trade is the red sour cherry (Northern Montmorency) packed mainly in New York, Michigan and Wisconsin. It was estimated that the pie industry consumed 85 to 90 per cent of the 16,000,000 lb. 1935 pack.

The pie industry uses almost all of the frozen blueberries (both domestic and imported) estimated at about 5,100,000 lb. in 1936.

Apples are the most popular pie fruit and the only fruit used consistently the year round in pies in the territory covered by the survey. Frozen apple slices packed in 30 lb. tins are increasing in use and bakers like this pack because of its convenience.

Fruit frozen for the pie industry is mostly packed in 30-lb. tins, 30-lb. wooden lugs and 36-lb. crates which net about 30 lb. of capped and sorted fruit.

Table XIV—Location and Consumption of Frozen Blueberries

Packed in 30-lb. lugs
1935 Market Survey

Location	Total lugs
Chicago, Ill.	13,200
Detroit, Mich.	10,000
Cleveland, Ohio	5,000
Pittsburgh, Pa.	2,000
Boston, Mass.	25,000
New York, N. Y.	71,000
Philadelphia, Pa.	7,000
Baltimore, Md.	2,500
Washington, D.C.	450
	136,150

Notes: All frozen blueberries were consumed by the pie baking industry. Above is an estimated consumption based on interviews with leading bakers, as well as reports by brokers and cold storage warehouses. Distribution is so scattered to small consumers that an informative check through consumer interviews alone was impossible. All the berries listed were imported from Canada, Newfoundland, New Brunswick, and Nova Scotia. The 136,150 lugs equals 4,084,500 lb. Leading importing brokers reported average annual importations of 4,700,000 lb. The U.S. Bureau of Foreign and Domestic Commerce reported importations (December 1934 to December 1935) of 4,259,720 lb.

One pie baker in New York City reported the use of 20,000 — 30-lb. tins of Maine blueberries packed in sugar, (5/1), the only large consumption of domestic berries located.

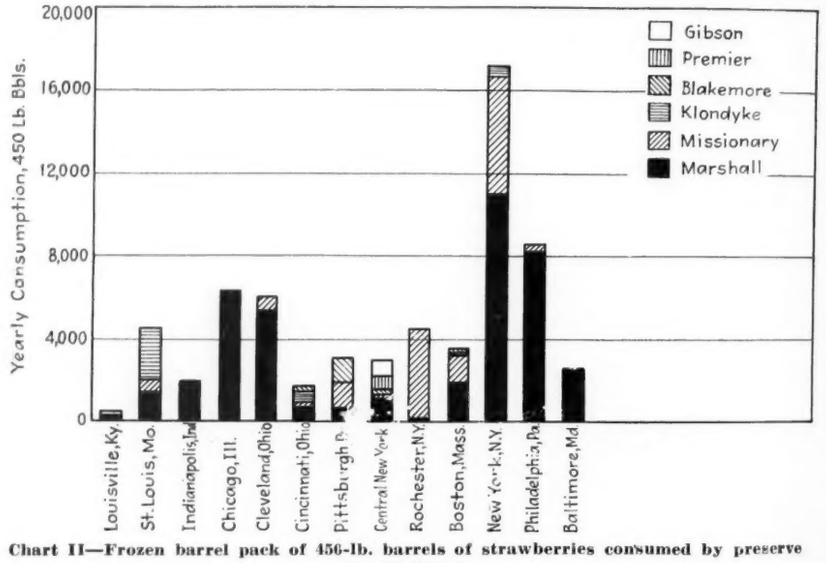


Chart II—Frozen barrel pack of 456-lb. barrels of strawberries consumed by preserve manufacturers

Table XIII—Location of Consumption and Use of Frozen Pack Peaches
450-lb. bbls.

Location	Total	Variety	Source	Pack
St. Louis, Mo.....	8	Elberta....	Georgia.....	3/1
Cincinnati, Ohio...	27	.....	.....	3/1
Rochester, N. Y...	6	.....	.....	...
Syracuse, N. Y....	4	Elberta.... Ga. Belle	Georgia.....	2/1
Boston, Mass.....	20	Elberta....	Georgia.....	3/1
New York, N. Y...	50	.....	Georgia.....	4/1
Philadelphia, Pa...	1,400	Elberta.... Ga. Belles	Georgia.....	3/1
Baltimore, Md....	105	Elberta...	Georgia.....	3/1
Washington, D. C..	90	Elberta.... Ga. Belles.	Georgia..... Georgia	3/1
Richmond, Va.....	50	Elberta.... Ga. Belles.	North Carolina North Carolina	2/1
	1,760			

Note: No consumption reported by preserve and pie trades.

Type of pack — Fruit/sugar ratio
3/1 — 1,656
2/1 — 54
4/1 — 50

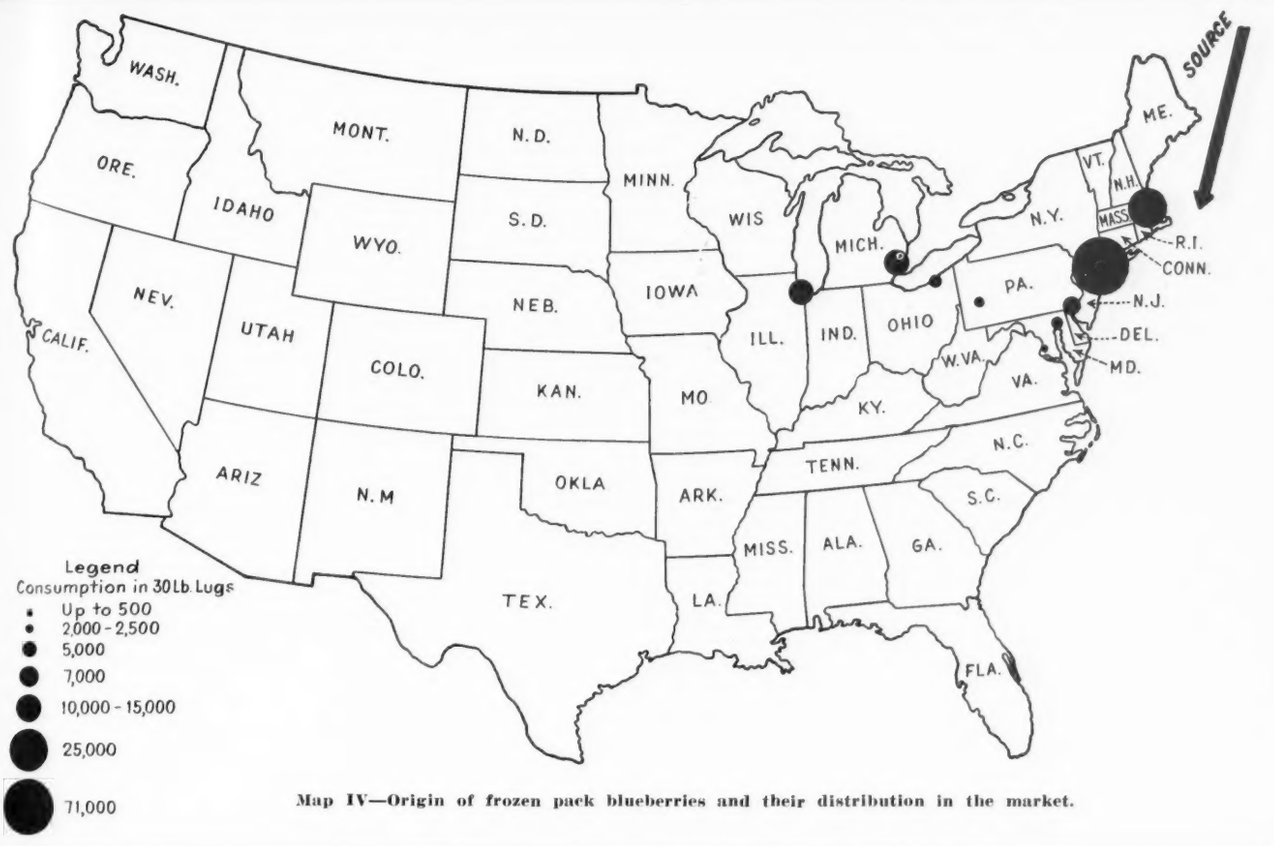
Institutional and Retail Markets For Frozen Foods

Packing for the institutional trade, so far as frozen pack fruits are concerned, does not differ greatly from packing for processors, except that smaller containers are used. Distribution falls naturally into established channels—broker to wholesaler or jobber, to consumer. Prices are logically higher for the smaller unit packs and the more widely distributed market lessens to some extent the competitive pressure on prices.

Packing and freezing fruits for retail distribution involves more details. Smaller packages of various types are used. Different freezing methods are employed by the packers who specialize in this market. Distribution starts out along the same channels—broker, wholesaler, retailer. But with the retailer trouble is met, for he seldom has facilities for holding frozen products or any special incentive to push their sale.

One large concern packing for the retail trade packs fruits in cartons. Apart from this pack, the 1-lb. paper cup pack of strawberries and red raspberries is a significant retail pack. Some of this pack is repacked from barrels and 30-lb. tins.

Northwest reports showed a total of 1-lb. containers packed in 1930, of 1,672,536 packages of strawberries and 183,498 packages of red raspberries. These packs declined to 494,454 and 10,548, respectively, in 1934. In 1935, the figures rose to 845,712 and 15,432.



Map IV—Origin of frozen pack blueberries and their distribution in the market.

These latter figures include the carton pack already mentioned.

Distribution of the fruit frozen in cups was mostly in the Boston district, with some in the New York district. Many of the stores that handled this pack had inadequate refrigeration facilities, which may account for the declining demand. With the adequately refrigerated storage cabinets used by the largest distributor this decline has not occurred.

Until consumer demand has been created and retailers are provided with the proper storage facilities, the retail market is pioneer territory.

Distribution to the home market involves the tastes, habits and pocket books of some 32,000,000 families, as well as the reactions, both practical and financial, of thousands of chain and independent retail stores.

The development and distribution of a new food product is an especially hazardous undertaking. The food industry has experienced so many failures, attended by so much financial loss, that experienced food processors and distributors are most reluctant to take up a new product—especially any product which involves so radical a change in equipment, methods of handling, and consumer preferences as frozen fruits, vegetables and meats. Only the prestige in the food industry, and the financial resources, of General Foods Corporation could have influenced the retail stores into making the early attempts to sell frozen foods.

Pioneer work in packing for the retail trade was started in New York State in the late 1920s, and in 1929 vegetable freezing commenced at Hillsboro, Ore. The U.S. Frozen Products Laboratory at Seattle has carried on experiments and many of the Agricultural Experiment Stations have studied the frozen pack as applied to products of most interest to the farmers of their states.

Home and institutional marketing of frozen foods is a more interesting subject to both the farmer and the packer than sales to processors, because it involves any and all foods that can be preserved by freezing. Fruits, vegetables, fish, other seafoods, poultry and meat may be frozen and distributed by the same organization. This entails a thorough investigation of methods of packing and freezing, and of the varieties of products most suitable for freezing, as well as close observance of changing consumer preferences and market conditions. Too many factors enter this picture to make any dependable market forecasts or conclusions possible at this time.

In a review of the frozen food industry for home consumption, prepared by a public utility company, one company was credited with a production of about 10,000,000 lb., all products, in 1934, and 15,000,000 lb. in 1935. This report estimated the entire frozen food production in 1934, for the home and institutional market, as 10,000,000 lb. of vegetables, fruit and meat, 8,000,000 lb. of fruit juices, and 18,000,000 lb. of fish, a total of 36,000,000 lb.

In April, 1936, the *Financial World* gave the following table of retail outlets maintained by this same large producer:

1930	50
1931	75
1932	200
1933	400
1934	750
1935	1,200
1936	1,900 (estimated)

Retailers of frozen foods report that shelled green peas are the most popular item. Sliced, sweetened strawberries are the next most popular. In Boston, a leading independent grocer reported the order of popularity of frozen products as follows:

Fruit	Vegetables	Meats
Red Raspberries	Peas	Hamburger Steak
Strawberries	Spinach	Broilers
	Baby Lima Beans	Chops
	Cut Corn	
	Wax Beans	
	Broccoli	

In New York City, a leading retail grocer reported the following order of popularity of products:

Fruits	Vegetables	Meats	Poultry
Strawberries	Baby Lima Beans	Beef Steak	Broilers
Red Raspberries	Green Peas	Chopped Steak	Frying Chickens
	Cut Corn	Lamb Steak	Roasting Chickens
	Asparagus		Ducklings
			Turkeys

The market survey found generally favorable reactions to the use of frozen foods in the institutional trade.

Opportunity for Increased Market

While preservers, ice cream makers and, to a certain extent, pie bakers, have practically replaced the fresh and canned fruits formerly used by frozen pack fruits, the institutional trade has only recently started this shift to frozen pack foods.

One indication of the growth of the institutional market is the increase in Northwest frozen pack vegetables from 750,000 lb. in 1934 to 7,500,000 lb. in 1935.

A concern which has been mainly interested in packing all kinds of frozen food products for the retail trade, has found the institutional trade a more receptive market and is making a concentrated drive to replace both canned and fresh foods in hotel, restaurant, steamships, railroads and other institutional kitchens.

Table XV—Location of Eastern Preserve Manufacture
Three Most Important Fruits

Location	Strawberries Per Cent	Red Raspberries Per Cent	Blackberries Per Cent
New York	27	30	31.5
Philadelphia	13	7.5	19
Chicago	10	12.5	....
Cleveland	10	15	....
St. Louis	7	....	6.2
Rochester	7	....	....
Boston	6	12	....
Cincinnati	..	....	16
Pittsburgh	..	....	9.2
Indianapolis	..	11	9.2
Per Cent Total in these cities	80	88	91.1

Table XVI—Ice Cream Sales—Flavor Analysis

Flavor	Districts of the United States: North Atlantic	Central Eastern	Southern	Middle-western	Western	United States (All Districts)	Canada
Vanilla	39.35%	60.18%	50.29%	67.39%	57.96%	48.46%	64.98%
Chocolate	21.26	8.89	12.14	11.18	12.31	16.78	4.89
Strawberry	8.72	8.08	10.50	5.05	9.79	8.27	11.55
Peach	3.50	.55	2.47	.39	.24	2.27	.....
Cherry	2.63	1.06	2.71	1.52	.15	1.98	2.80
Maple	1.34	1.47	.93	2.45	2.55	1.62	11.15
Burnt Almond	1.95	.....	.87	.11	.22	1.18	.....
Pineapple	1.94	1.17	2.05	.56	.33	1.50	1.31
Black Walnut	.50	.12	2.05	.54	.34	.50	.....
Caramel	.51	.18	.38	.50	.17	.41	.....
Butterscotch	.21	.47	.21	.31	.10	.26	.69
Banana	.12	.13	.98	.49	.37	.24	.....
Coffee	.33	.02	.02	.02	.07	.20	.18
Raspberry	.22	.14	.06	.07	.12	.17	.....
Tutti Fruitti	.....	.37	.18	.75	.17	.17	.....
Fruit Salad	.04	.18	.05	.22	.60	.15	.36
Lemon	.06	.07	.86	.21	.29	.14	.....
Pistachio	.05	.....	.16	.....	.28	.07	.....
Nesselrode	.02	.....	.05	.03	.....	.02	.....
Miscellaneous*	17.07	16.92	13.04	8.21	13.94	15.61	2.09
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

* Includes sherbets, frozen suckers, etc., when reported separately. From International Association of Ice Cream Manufacturers, 22d General Survey, Special Bulletin No. 42 — March, 1933.

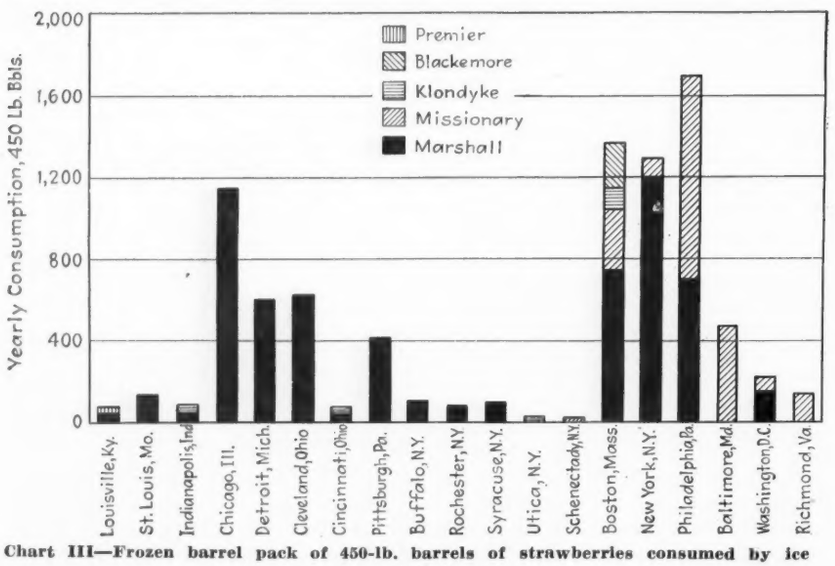


Chart III—Frozen barrel pack of 450-lb. barrels of strawberries consumed by ice cream manufacturers.

Conclusions

The per capita consumption of any particular food remains fairly uniform, but the form in which the consumer purchases that food may vary considerably. The season of the year may determine the choice between fresh or canned; or local market conditions may be the determining factors. Advertising and publicity of a processed food affect the choice. Price and convenience are probably the factors of greatest weight in influencing the consumer to choose between various foods.

The youngest of the food processing industries, frozen food, is now firmly established by quality, price and convenience in the supply of raw materials for processing into other forms of food products. In hotels and restaurants in the Northeast, the sale of frozen foods has increased rapidly. Advertising and educational publicity are advancing the consumption of frozen foods in the home. All of this consumption is at the expense of markets for canned and fresh foods.

The manufacture of preserves consumes such a large part of the frozen barrel pack of berries that it is the controlling factor in this branch of frozen food packing. Other industries do not use enough of this pack to absorb the fluctuations in preserve consumption, hence both packer and grower are dependent upon the preserve trade not only for volume but also for price received.

Unlike the processing market for cold pack fruits, the wholesale and retail markets to institutions and the home have not been substantially filled by frozen pack products. There is still opportunity for great expansion of these markets.

The rapid increase in sales to the institutional trade indicates a probable domination of this market by frozen foods. Distribution channels, storage facilities, containers, and methods of pack to meet the institutional trade have been satisfactorily developed and no prospective checks to increasing sales appear.

Wider distribution in smaller quantities lessens the probabilities of a situation comparable to the position of the preservers in the barrel pack market. The broad market for many products offers the packer a longer processing season, and the grower a more varied production, employing land and labor over a longer period. The demand for peas gives the grower a legume crop for rotation purposes to maintain soil fertility.

The total replacement of canned and fresh foods in the retail market, a wild dream of the early days of frozen food production, is most unlikely of fulfillment. Whatever final balance is reached, the change will be gradual in the retail market.